

Connecticut Siting Council Review of the Ten-Year Forecast of Connecticut Electric Loads and Resources

Draft Report

June 6, 2007

INTRODUCTION

Pursuant to Connecticut General Statutes (CGS) § 16-50r¹, the Connecticut Siting Council (Council) annually reviews the forecasts of electric loads and resources in the State of Connecticut.

By March 1, each year, all Connecticut electric transmission/distribution companies and electric generators with an output of greater than one megawatt² (MW) are required to provide a report to the Council, either estimated or actual, on energy use and peak loads for the five preceding years, and peak loads, resources, and margins for the ten upcoming years. Any current plans to build new generating plants or transmission/distribution lines, place new ones into service, upgrade existing ones (including plans to bury lines, as mandated by law), must also be stated. In addition, the Council examines the forecast from the Independent System Operator for New England (ISO-NE).

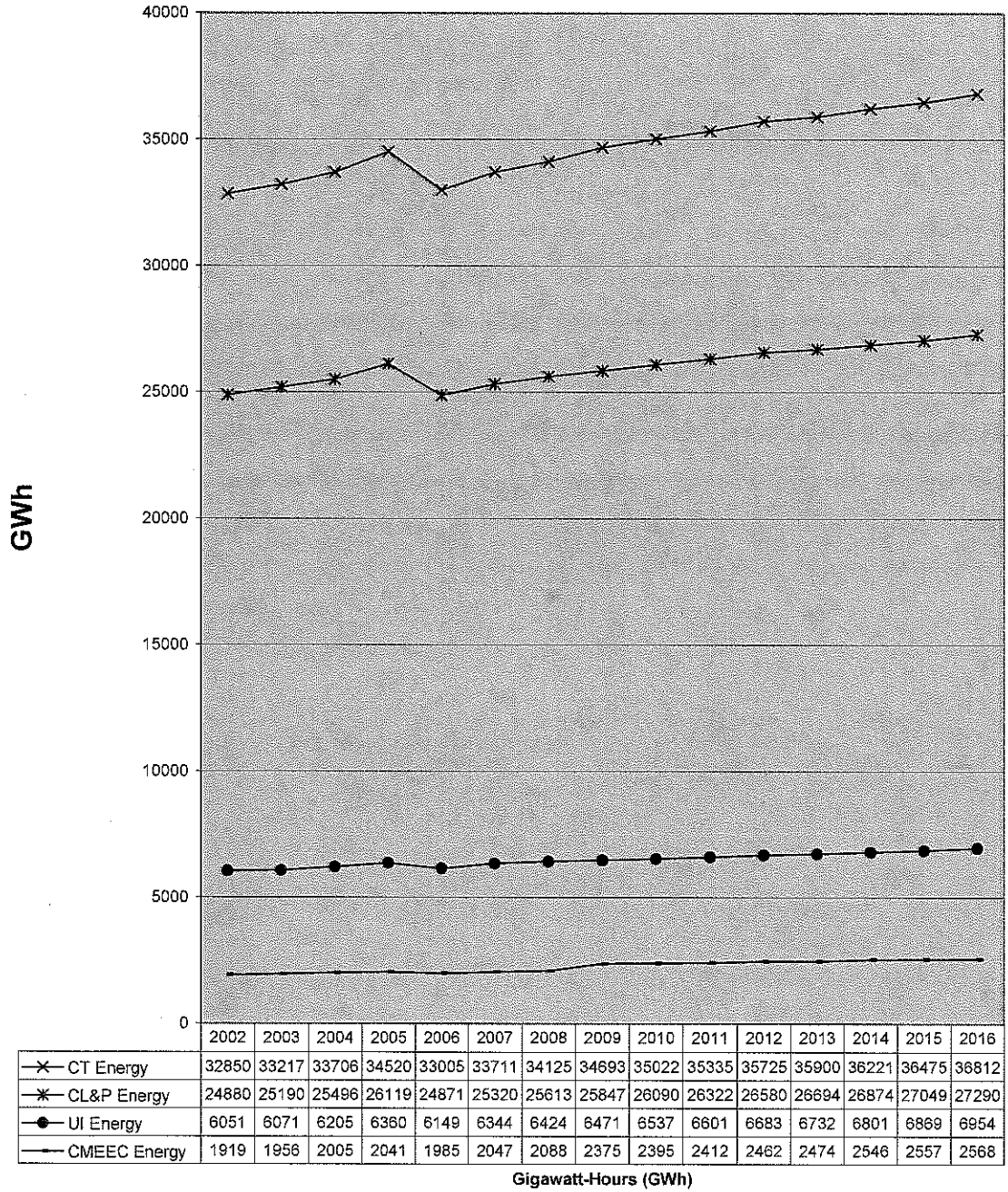
By statute, the Council must hold a public hearing including one session for public comment after 6:30 p.m. Accordingly, the Council will hold a public hearing on this matter on June 12, 2007 beginning at 10:00 a.m. and including a public comment session at 7 p.m.. After gathering this information, the Council will issue a final report.

ELECTRIC ENERGY CONSUMPTION AND LOAD FORECAST

ENERGY CONSUMPTION GROWTH

The state's electric transmission/distribution utilities, The Connecticut Light and Power Company (CL&P), The United Illuminating Company (UI), and the Connecticut Municipal Electric Energy Cooperative (CMEEC), predict the total annual electric energy requirements for the state throughout the forecast period to grow from 33,711 GWh² in 2007 to 36,812 GWh during 2016. This results in a statewide average annual compound growth rate of 0.98 percent. CL&P projects an average annual compound growth rate of 0.84 percent throughout the forecast period. CMEEC projects a 2.6 percent average annual compound growth rate, and UI projects a 1.0 percent average annual compound growth rate. The forecast of the state's electrical energy requirements is depicted in Figure 1.

Figure 1: State and Utility Energy Requirements in GWh



Forecasting is a tool used to decrease the risk between electric supply and demand. The demand for electricity can be affected by weather, economic conditions, customers' usage patterns, and improvements in efficiency, including conservation. The supply of electricity can be affected by private entities' interest in constructing new generation, the operating condition of older generating plants, scheduled or unscheduled shutdowns of generating plants, and limitations in the transmission system, including the ability to import electricity.

There are inherent risks in both under and over-forecasting electric demand. Under-forecasting demand for electricity could result in insufficient generation, transmission, and distribution facilities, which could result in blackouts, brownouts, and other service problems. Alternatively, over-forecasting could result in excessive generation, over-designed transmission, and the like, which could lead to unnecessary expenditures. For all its uncertainty and risk, however, forecasting still is an indispensable tool for guiding the development of the electric power system.

Historically, Connecticut's increasing electricity consumption over the long term is largely attributable to the number of new and larger homes, an active economy, the growing use of electric appliances or office machines, computers, and especially air conditioning.

GROWTH IN PEAK LOADS

Connecticut is a summer peak load³ state. That is, the state's highest electrical load for the year typically occurs on a summer day. This is largely attributable to air conditioning. Air conditioning is often one of the largest electrical loads in homes and buildings. For this reason, this report will focus on the summer peak loads, as it represents the worst-case scenario for the electric system as winter peaks are generally significantly less.

In CL&P's 2007 Forecast Report, CL&P notes an interesting phenomenon. Although customers are conserving electricity during most of the year in reaction to higher energy prices, they appear to be less concerned about high prices during the summer heat waves when they increase their use of air conditioning, resulting in higher growth in peak demand. This results in less annual electric energy consumption, but summer peak loads that continue to grow.

Specifically, Figure 2 depicts the actual and projected peak electric loads for Connecticut from year 2002 through 2016⁴. In 2006, the peak electric load for the state was approximately 7,366 MW, which is a 3.2 percent increase from the previous high in 2005 of 7,135 MW⁵, and a 16 percent increase from the year 2004 peak load of 6,364 MW.

Connecticut's electric utilities estimate that the total peak load, under normal weather conditions, will be 7,035 MW in 2007. Looking ahead, this number is expected to grow to 8,059 MW in 2016. This results in an average annual compound growth rate of 1.5 percent for the state. This data takes into account the resulting decrease in load from

conservation and load management programs by the utilities and is depicted on Figure 2 as “CT Utilities’ Peak w/conservation.”

The majority of Connecticut’s peak load is attributed to CL&P customers, since CL&P has the largest service area of the three utilities. For example, about 75 percent of the 2007 projected peak load is from CL&P customers. The CL&P peak load data provided in Figure 2 are based on a 50/50 scenario, which means that the peak load has a 50% chance of being exceeded in a given year.

The Connecticut utilities’ projected (future) data (except for the extreme weather scenario) are weather-normalized. This means that the data are based on average historical weather conditions over an approximately 30-year time period. For example, CL&P’s forecast model assumes a mean daily temperature⁶ of 83 degrees Fahrenheit (F) for a summer peak day, based on average peak temperatures from 1972-2001. For the extreme weather scenario, CL&P’s projected loads are based on a mean daily temperature of 88 degrees F on a peak day. CL&P’s extreme weather forecast is approximately a 98/2 scenario, i.e. the forecast peak would have approximately a two percent chance of being exceeded. However, this assumes the same economic and other non-weather factors as the 50/50 scenario.

In addition to compiling the Connecticut utilities’ electric load forecasts, the Council also reviews and considers the forecast produced by ISO New England (ISO-NE). ISO-NE is the organization that oversees New England’s bulk power and transmission, administers the region’s wholesale electric market, and manages regional planning processes for electric transmission. It receives forecast data from the Connecticut utilities, but prepares its own forecasts for Connecticut, the other New England States, and the region as a whole.

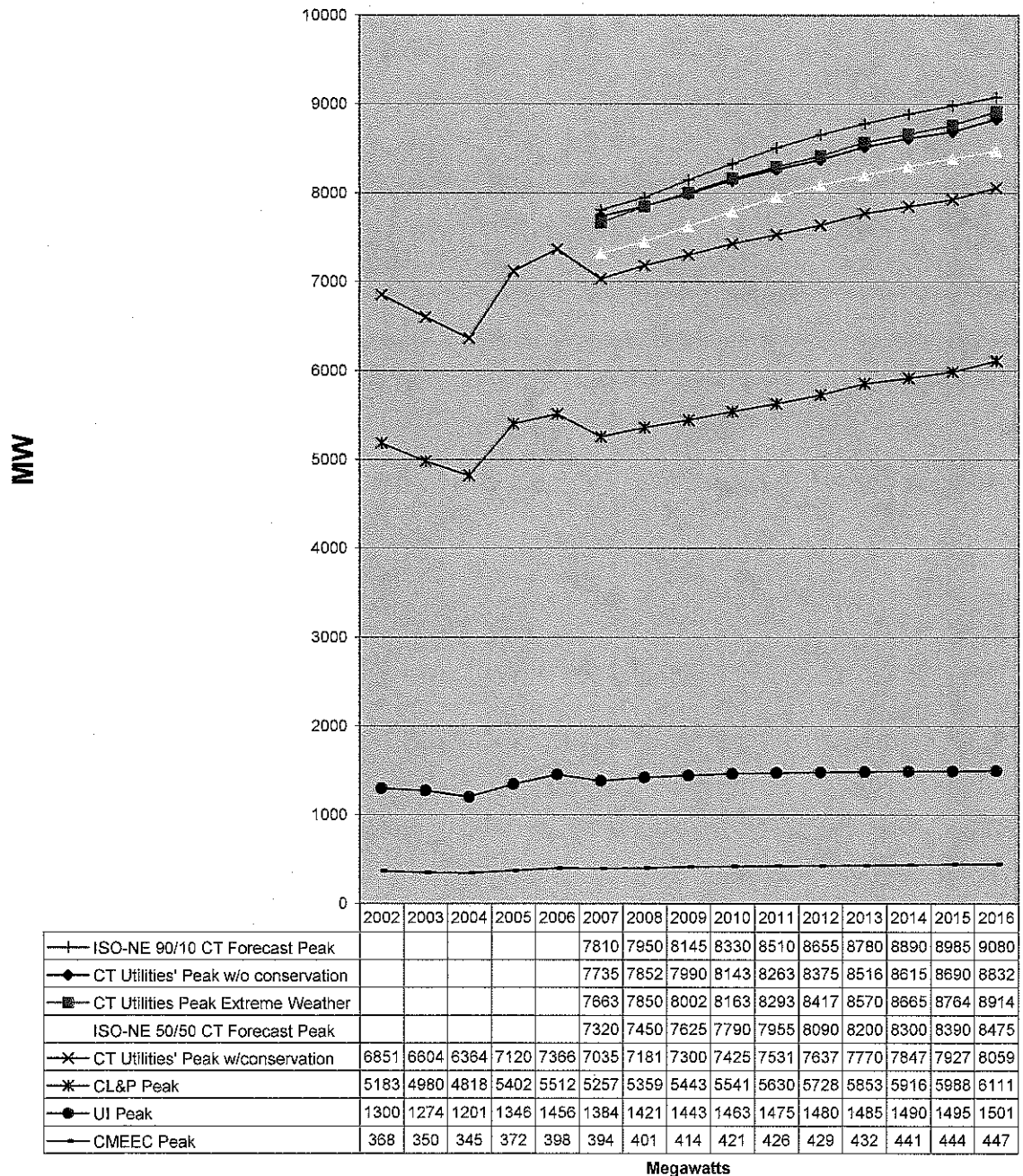
It is also important to note that the three state utility forecasts and the ISO-NE forecast serve different purposes. The state utility forecasts are used for internal utility financial planning purposes, whereas the ISO-NE forecast is used for utility infrastructure planning. The ISO-NE forecast is a stand-alone forecast and is not reconciled with the state utility forecasts.

Using its own 50/50 analysis, ISO-NE predicts that the total Connecticut peak load will grow from a projected 7,320 MW in 2007 to 8,475 MW in 2016. This results in an average annual compound growth rate of 1.6 percent for the state. In the 90/10 scenario (meaning the peak load has only a 10 percent chance of being exceeded), ISO-NE predicts that the summer peak load will grow from 7,810 MW in 2007 to 9,080 MW in 2016. Thus, the ISO-NE 90/10 forecast results in an average annual compound growth rate of 1.7 percent for the state.

As depicted in Figure 2, the ISO-NE 90/10 forecast is the top curve, obtained from ISO-NE’s 2007 Forecast of Capacity, Energy, Loads and Transmission (CELT) Report. This forecast is used for transmission grid planning to ensure that the electric system is designed to handle unusually high peak loads. For example, in the summer of 2006,

Connecticut set a peak load record of 7,366 MW: this greatly exceeded the utilities' 2006 normal weather forecast of 6,855 MW and ISO-NE's 50/50 forecast peak of 7,250 MW at that time. However, this peak did not exceed ISO-NE's 90/10 forecast peak of 7,730 MW. Accordingly, in Table 3 of this report (see page 10), the Council has included the ISO-NE 90/10 peak load forecast to provide the most conservative comparison of resources versus load.

Figure 2: State and Utility Peak Load in MW



CONNECTICUT ENERGY EFFICIENCY FUND

In 1998, the Connecticut Legislature created the Energy Conservation and Management Board (ECMB) to guide CL&P and UI in the development and implementation of an annual plan, which is submitted for approval by the Department of Public Utility Control (DPUC), for cost-effective energy conservation programs pursuant to CGS § 16-245m. This legislation also created the Connecticut Conservation and Load Management Fund, now named the Connecticut Energy Efficiency Fund (CEEF). The CEEF supports energy efficiency and increased productivity; it also helps to reduce the peak electric demand in the state, especially in southwest Connecticut.

Until recently, the CEEF has applied to private investor-owned electric distribution companies only. However, with the passage of Public Act 05-01, CEEF has been recently expanded to include CMEEC, which represents the state's municipal electric utilities.

According to the ECMB's annual report to the legislature dated March 1, 2007, in 2006, CL&P and UI customers contributed a total of approximately \$71 million to the CEEF Fund via a per kWh surcharge on their electric bills. The energy savings resulting from CEEF programs in 2006 is projected to be 328 GWh, a 3 percent increase from the year 2005 actual savings of 318 GWh. Assuming an average electric price of 18.3 cents per kWh, the 2006 CEEF measures are expected to result in approximately \$60 million in annual savings and \$843 million in lifetime projected energy savings.

The CEEF also reduces air pollution by reducing demand for electric generation. The ECMB estimates that carbon dioxide emissions were reduced by 180,789 tons in 2006 due to CEEF measures. Carbon dioxide is believed to be a "greenhouse gas" associated with global warming and is emitted by all fossil fuel burning power plants. In addition, the CEEF reduced emissions of pollutants such as sulfur oxides and nitrogen oxides in 2006 by 333 tons and 89 tons, respectively. Table 1 depicts the actual annual and lifetime projected reduction in air pollution due to the CEEF.

Table 1: Air Pollution Reductions Due to Current CEEF Programs (in tons)

	2006 Annual Actual Savings	2006 Lifetime Actual Savings	2007 Annual Projected Savings	2007 Lifetime Projected Savings
Sulfur Oxides	333	4,673	232	2,733
Nitrogen Oxides	89	1,243	97	727
Carbon Dioxide	180,789	2,536,814	125,841	1,483,452

Source: ECMB Report dated March 1, 2007

CL&P CEEF contributions are projected to reduce the peak summer demand by approximately 689 MW in 2007 and 656 MW in 2016 in CL&P's service area. This is equivalent to the output of a moderately-sized power plant. Similarly, UI's CEEF

contributions are projected to reduce the peak summer demand by approximately 9 MW in 2007 and as much as 114 MW by 2016. CMEEC projects 1.5 MW of load reduction in 2007, and 3 MW by 2016. This results in a statewide total projected peak load reduction of approximately 700 MW in 2007 and 773 MW in 2016. (This forecast assumes that the CEEF program would continue throughout the ten-year forecast period.)

Figure 2 depicts the Connecticut utilities' peak load with these conservation measures considered and also depicts what the projected peak loads would be without CEEF measures. Without CEEF measures, even under normal weather conditions, Connecticut's peak load would be significantly higher, roughly matching the utilities' extreme weather load projections.

The Council believes that energy efficiency and programs like CEEF are an extremely important part of Connecticut's electric energy strategy. Increased efficiency allows the state's electric needs to be met, in part, without the additional pollution caused by new generating facilities. Reductions in peak load due to increased efficiency can also increase the life of existing utility infrastructure, such as transmission lines and substation equipment (transformers, distribution feeders, etc.). However, the Council cautions that energy efficiency measures alone cannot meet all of state's growing electric demand. The supply side of the equation will be examined next.

RESOURCE FORECAST SUPPLY RESOURCES

The Council anticipates that the state's supply resources will be adequate to meet demand in the near term under normal weather conditions (using either the utilities' normal weather forecast or ISO-NE's 50/50 forecast) assuming no loss of existing generation due to retirement. However, taking into account the most conservative forecast (ISO-NE's 90/10 estimate), Connecticut faces a significant generation capacity shortage beyond 2008. (See Table 3, page 10.)

Milford Power generating plant was activated in 2004. It is fueled with natural gas, and has a summer power output⁶ of approximately 492 MW. In 2001, a natural gas-fired generating plant in Wallingford was activated which has a summer power output of approximately 214 MW. In 2002, the Lake Road Power Station in Killingly was activated. The Lake Road facility is natural gas-fired, and it has a summer power output of approximately 714 MW. Three additional generation facilities: NRG in Meriden (544 MW); Towantic Energy in Oxford (512 MW); and Kleen Energy in Middletown (520 MW) have been approved, but have not materialized due to financial constraints. Their in-service dates are not known and thus have been estimated on Table 3 (page 10), assuming a three-year lead time.

In addition, some subregions such as southwest Connecticut have supply deficiencies and operating problems due to insufficient transmission and inadequate resources within the region. To address the transmission deficiencies in southwest Connecticut, two large transmission projects, Docket No. 217 Bethel – Norwalk 345-kV line and Docket 272

Middletown – Norwalk 345-kV line have been approved by the Council. The Bethel – Norwalk line was activated in 2006 and the Middletown – Norwalk line is expected to be in service by 2009. These two projects will create a 345-kV loop that will fully integrate southwest Connecticut with the rest of the state and relieve the transmission constraints in this area.

If a major failure in serving base load were to happen—for instance, if Millstone nuclear units were to go offline—Connecticut’s electric generating and transmission/distribution companies would institute the following plan:

- operate all available generating units to their reasonable limits;
- maximize the import of electricity from adjacent states;
- explore possible interruption of service with certain industrial and commercial customers;
- maximize the use of customer-owned generators; and
- implement public awareness efforts for conservation and load shifting, including voluntary reductions and/or shifting consumption to off-peak hours.

Although such response mechanisms have been helpful in the past, it is also vitally important for resources to be strategically located on the grid to ensure supply, both technically and economically. Some generating plants that were called upon to generate at their maximum capacity in the past may not be able to do so in the future because of age, transmission constraints, fuel restrictions (such as natural gas shortages during periods of extreme demand), or environmental concerns (such as air emission regulations).

NRG Plan for Connecticut

On June 21, 2006, NRG unveiled a comprehensive plan for its generating fleet in the State of Connecticut called “Powering Connecticut with NRG.” (See Table 2.) Specifically, NRG proposes to increase capacity at the Cos Cob generating plant with 40 MW of dual-fuel, quick-start generation. This project is currently under Council review as Petition No. 812.

NRG is also considering the possibility of retiring 492 MW of its existing 497 MW of existing generation at the Montville facility and install a 630 MW clean coal facility. (See section on Coal Powered Generation). Boiler renovations for the Norwalk Harbor Station are proposed by NRG. These renovations would not change the power output, but would decrease the oxides of nitrogen emissions. The Devon units 7 and 8 would be returned to service to meet near-term reliability needs. Later, the Devon units 7 and 8 would be retired and replaced with four new peaking units. At the Middletown site, NRG proposes to replace two older oil-fired units with 300 MW of new peaking units. The projected power outputs and changes to existing power outputs are outlined below. If approved, these projects could add a total of approximately 124 MW of much needed generation to Connecticut.

Table 2:	Powering Existing	Connecticut	with NRG	Proposal	
Location	MW	Retire MW	New MW	Total MW	Net +/- MW
Cos Cob	60	0	40	100	40
Montville	497	492	630	635	138
Norwalk	353	0	0	353	0
Devon	378	218	217	377	-1
Middletown	770	353	300	717	-53
Totals	2058	1063	1187	2182	124

Source: NRG Comments dated July 5, 2006

Project 100

In Public Act 03-135, the legislation requires that electric distribution companies enter into minimum 10-year contracts for not less than 100 MW of Class I renewable electric capacity. These long-term power purchase contracts must be filed by July 1, 2008 and be with projects that: receive funding from the Connecticut Clean Energy Fund; began operation after July 1, 2003; and are at least 1 MW in capacity. The Project 100 solicitation focuses on projects that: are beyond the pre-development stage; use commercially available technologies; have already achieved substantial progress in permitting and site control; and are ready for deployment. Project 100 is included in Table 3, as the 100 MW of capacity must be realized to meet a statutory requirement.

Wallingford Pierce Plant Re-Powering

The Alfred L. Pierce Generation Station was the former site of approximately 22.5 MW of coal-fired electric generation. The plant was decommissioned in July 2000. On July 11, 2006, CMEEC submitted a petition (Petition No. 778) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed re-powering of the plant.

In the Petition, CMEEC proposed a new single unit combustion turbine with an average electric output of approximately 84 MW, which would be connected to the existing Wallingford East Street Substation via underground 115-kV cable. The proposed unit would be fueled (primarily) by natural gas and would also have approximately a 24-hour oil fuel supply.

The Council approved this petition on September 28, 2006. This project is expected to provide additional generation to SWCT and Connecticut as a whole. CMEEC anticipates that the plant will be fully available by October 2007. Accordingly, this plant is listed in Table 3 beginning in 2008.

Waterside Power

On June 20, 2006, Waterside Power, LLC (Waterside) submitted a petition (Petition No. 772) to the Connecticut Siting Council (Council) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to the existing temporary 69.2 MW oil-fired peaking project located at 17 Amelia Place in Stamford, CT. Waterside sought permission from the Council to participate in the ISO-New England's Locational Forward Reserve Market (LFRM) from October 1, 2006 through May 31, 2009 or in the alternative through May 31, 2007, and if such authorization is provided, to make modifications to the existing peaking plant that are necessary to facilitate such operations. On July 27, 2006, the Council approved the Petition. This facility is listed in ISO-NE's June 2007 Seasonal Claimed Capability report and is reflected in Appendix A and Table 3. Waterside was also selected as part of an RFP issued by the DPUC. See the section titled "An Act Concerning Energy Independence."

Connecticut Resource Balance

Table 3: CT Resource Balance
(based on ISO-NE's 2007 90/10 Forecast
and Table 4.8 of ISO-NE's 2005 RSP)
(units are in megawatts)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Capacity Situation										
ISO-NE 90/10 Load	7810	7950	8145	8330	8510	8655	8780	8890	8985	9080
Reserves (largest unit)	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Total Capacity Req'd	9010	9150	9345	9530	9710	9855	9980	10090	10185	10280
Existing Capacity* (See Appendix A)	6856	6856	6856	6856	6856	6856	6856	6856	6856	6856
Assumed Unavailable Capacity	501	501	501	501	501	501	501	501	501	501
Total Net Capacity	6355	6355	6355	6355	6355	6355	6355	6355	6355	6355
Import Limit	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
Total Available Resources	8855	8855	8855	8855	8855	8855	8855	8855	8855	8855
Available Surplus/Deficiency	-155	-295	-490	-675	-855	-1000	-1125	-1235	-1330	-1425
SWCT RFP Awards	256	256	0	0	0	0	0	0	0	0
Project 100				100	100	100	100	100	100	100
Wallingford Pierce Plant		84	84	84	84	84	84	84	84	84
Available Surplus/Deficiency	101	45	-406	-491	-671	-816	-941	-1051	-1146	-1241
NEEWS Project	0	0	0	0	0	1100	1100	1100	1100	1100
DPUC RFP Results:										
Kleen Energy Plant in Middletown					620	620	620	620	620	620
Peaking Peaking Facility Waterbury			96	96	96	96	96	96	96	96
Energy Efficiency Project by Ameresco		5	5	5	5	5	5	5	5	5
*Waterside Power in Stamford (Waterside Power is already included in existing capacity from Appendix A.)										
Connecticut Siting Council Assumptions:										
Hypothetical Retirement of Oil Fired Generation 40 years old or older	N/A	-942	-958	-1041	-1191	-1598	-1613	-2013	-2013	-2461
Approved Generation not completed										
Meriden				544	544	544	544	544	544	544
Middletown (Already included above.)										
Oxford				512	512	512	512	512	512	512
Total Available Surplus/Deficiency	101	-892	-1263	-375	-85	463	323	-187	-282	-825

Nuclear Powered Generation

Nuclear plants use nuclear fission (a reaction in which uranium atoms split apart) to produce heat, which in turn generates steam, and the steam pressure operates the turbines that spin the generators. Since no step in the process involves combustion (burning), nuclear plants essentially produce electricity with “zero-air emissions.” Pollutants commonly emitted from fossil-fueled plants are avoided, such as sulfur dioxide, nitrogen oxides, mercury, and carbon monoxide. Nuclear plants also do not emit carbon dioxide, which is believed to be a “greenhouse gas.” Another advantage to nuclear power is that it runs on domestic fuel, reducing dependence on foreign oil. However, issues remain with regard to security, the short and long-term storage of nuclear waste, and cost.

Connecticut currently has two operational nuclear electric generating units (Millstone Unit 2 and Unit 3) contributing a total of 2,035 MW of summer capacity, approximately 30 percent of the state’s generating capacity. (The Millstone facility is the largest generating facility in Connecticut by power output.) Previously, nuclear power supplied approximately 45 percent of Connecticut’s electricity. However, this capacity has been reduced by the retirement of the Connecticut Yankee plant in Haddam Neck (December 1996) and Millstone Unit 1 (July 1998).

Following these retirements, Dominion Nuclear Connecticut Inc. (Dominion), Millstone’s owner, recently increased the power outputs of Units 2 and 3 via an upgrade to the low pressure turbine rotors, so that the nominal design electric rating for Unit 2 went from 870 MW to 883.5 MW, and Unit 3 went from 1153.6 MW to 1156.5 MW. Thus, the total power output for these units increased by 16.4 MW without any rise in fuel consumption.

Dominion is currently investigating the feasibility of a capacity uprate of approximately 80 megawatts on Millstone Unit 3. Dominion anticipates the final decision of whether to pursue the uprate in the first half of 2007. If Dominion chooses to pursue the uprate, the increase in output could be delivered as early as the end of 2008.

Dominion submitted its license renewal applications to the United States Nuclear Regulatory Commission (NRC) on January 22, 2004. On November 28, 2005, the NRC announced that it had renewed the operating licenses of Unit 2 and Unit 3 for an additional 20 years. With this renewal, the operating license for Unit 2 is extended to July 31, 2035 and the operating license for Unit 3 is extended to November 25, 2045.

Coal Powered Generation

Connecticut currently has two coal-fired electric generating facilities contributing 553 MW, or approximately 8.2 percent of the state’s current capacity. The AES Thames facility, located in Montville, currently burns domestic coal and generates approximately 181 MW. The AES Thames facility is technically a cogeneration facility because, besides generating electricity for the grid, it also provides process steam to the Jefferson Smurfit-Stone Container Corporation.

The other coal-fired generating facility in Connecticut is the Bridgeport Harbor #3 facility located in Bridgeport. This facility burns imported coal and has a power output of approximately 372 MW.

In general, using coal as fuel has the advantages of an abundant domestic supply (US reserves are projected to last more than 250 years), and an existing rail infrastructure to transport the coal. However, despite the advantages of domestic coal, generators sometimes find imported coal more economical to use. Cost savings are realized by using low sulfur imported coal versus indigenous coal requiring more emissions control efforts.

In conventional coal-fired plants, coal is pulverized into a dust and burned to heat steam for operating the turbines. However, burning coal to make electricity causes air pollution. Pollutants emitted include sulfur dioxide, carbon monoxide, and mercury. In addition, carbon dioxide emissions have been alleged to contribute to global warming.

One alternative to conventional coal-fired generation is “clean coal technology.” This is a complex process in which gaseous fuel (such as carbon monoxide) is extracted from coal and then burned in a gas turbine engine. The result is higher efficiency and significant lower air pollution than conventional coal-fired power plants.

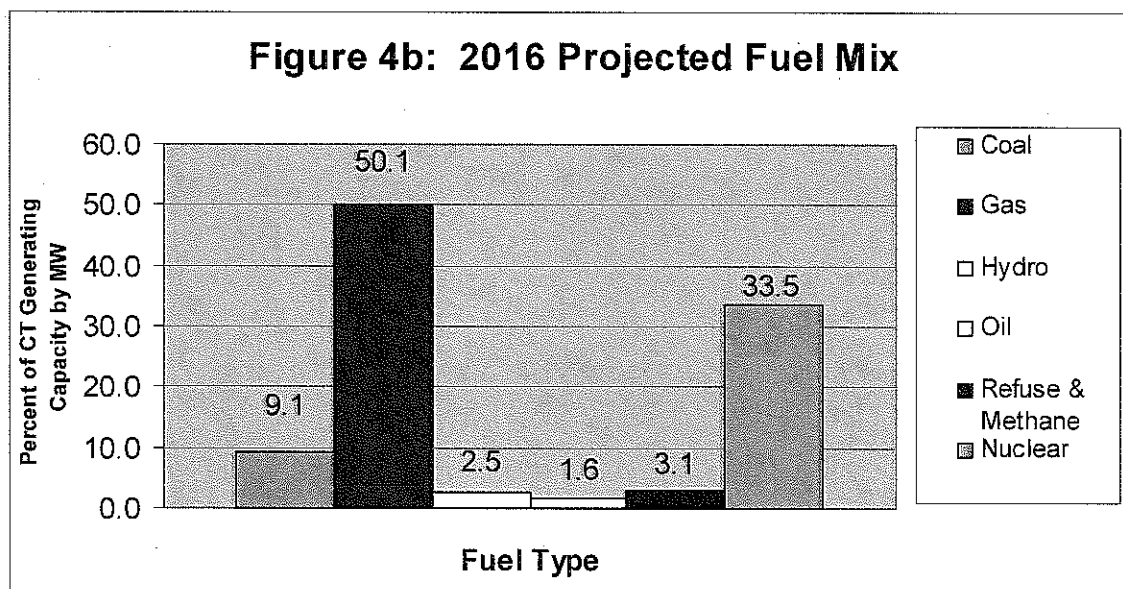
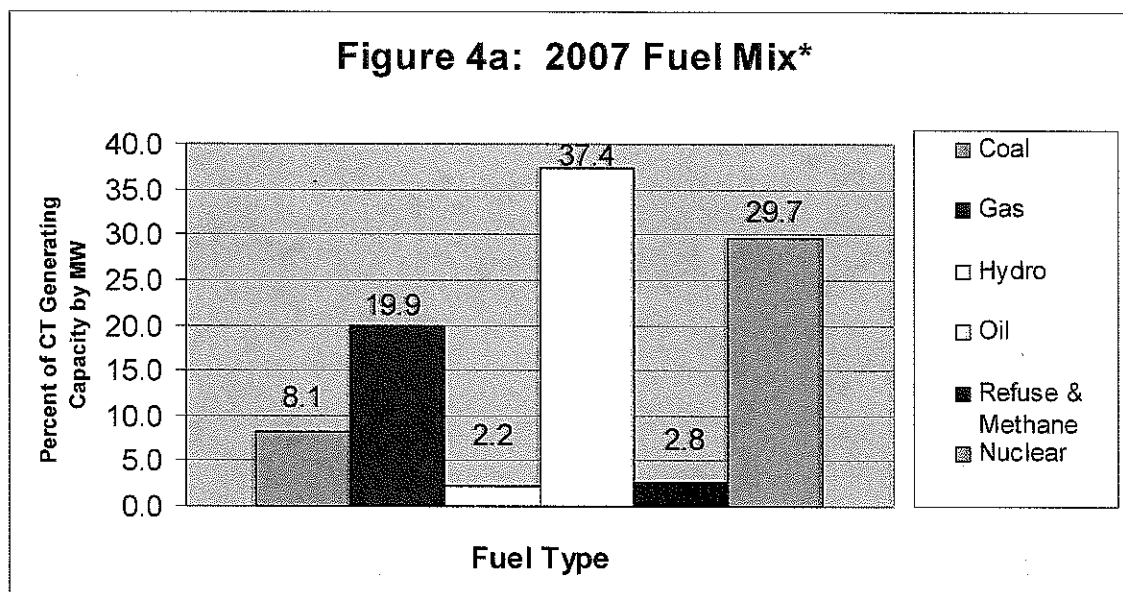
In particular, NRG is considering developing clean coal generation at one of its four major sites in Connecticut. The company is currently evaluating a 630 MW Integrated Gasification Combined Cycle (IGCC) plant.

Petroleum Powered Generation

Connecticut currently has 27 oil-fired electric generating facilities contributing 2,562 MW, or 37.4 percent of the state’s current capacity. This takes into account the reactivation of Devon 10 (14 MW) on June 29, 2006.

Both Devon 7 and 8 are considered deactivated reserve. However, NRG is evaluating their return to service. NRG’s efforts to date have included budgeting and scheduling return-to-service requirements including staffing the facility, and commissioning a transmission study with ISO-NE known as the Devon Export Expansion Project. Initial indications are that recent changes to the transmission system will allow deliverability of any generation from reactivated units at Devon.

However, because the industry generally rates the service life of oil-fired units to be 40 years, some older oil-fired units may face retirement during the forecast period. This could further reduce the already tight generation capacity in Connecticut, unless the loss is replaced by a sufficient number of new generating units. Figures 4a and 4b depict the existing and projected generation fuel mix for Connecticut, assuming the effects of possible retirements.



* Lake Road generating plant is not included in these figures. See page 26 for an explanation.

The 2015 fuel mix includes, as an assumption, all three natural gas-fired units that currently have not been constructed and/or completed. (See page 23.) In addition, Table 3 (see page 10) includes the hypothetical loss of Connecticut's resource capacity due to the retirement of oil-fired units 40 years of age or older.

New oil-fired generation is not expected in the near future, due to market volatility and mounting oil prices. In particular, the price of crude oil has recently exceeded \$70 per barrel this year. With approximately 60% of the nation's oil being imported, petroleum supply and prices are highly vulnerable to disruptions and instabilities in supplier countries.

Moreover, oil-fired generation presents environmental problems, particularly related to the sulfur content of the oil, and may face tighter air-emissions standards in the near-term, such as regulation of carbon dioxide emissions. Some of the oil-fired generating facilities in Connecticut are dual-fueled, meaning that they can switch to natural gas if necessary. Currently, four active plants in Connecticut (Middletown #2 and #3; Montville #5; and New Haven Harbor #1) totaling approximately 882 MW have the ability to change from oil to gas. The Council believes that dual-fuel capability is an important part of diversifying the fuel mix for electric generation and avoiding overdependence on a particular fuel.

Natural Gas Powered Generation

Connecticut currently has 14 natural gas-fired generating units (not including Lake Road) contributing a total of 1,367 MW, or 19.9 percent of the state's generating capacity. This includes recent additions such as the Milford Power facility, with a total summer seasonal claimed capability (SCC) rating of 492 MW.

Natural gas-fired electric generating facilities are preferred over those burning coal or oil primarily because of higher efficiency, lower initial cost per kW, and lower air pollution. Natural gas generating facilities also have the advantage of being linked directly to their fuel source via a pipeline.

Some natural gas generating plants, such as Bridgeport Energy, Milford Power and Lake Road, are combined-cycle. Added to the primary cycle, in which gas turbines turn the generators to make electricity, is a second cycle, in which waste heat from the first process is used to generate steam: steam pressure then drives another turbine that generates even more electricity. Thus, a combined-cycle plant is highly efficient. However, the tradeoffs are higher initial costs and increased space requirements for the extra generating unit.

In the event of severely cold weather, unusually high demand for natural gas to heat buildings can coincide with high demand for natural gas to generate electricity. At such times, some generating plants may experience either a forced outage due to pipeline capacity limitations, or an "economic curtailment", a situation in which it is not economical to generate electricity, given the higher natural gas fuel costs at that time. During economic curtailments, some units have the ability to switch to oil. Connecticut currently has 8 natural gas-fired generating plants that can switch to oil, totaling approximately 701 MW.

In a recent regional planning document (the 2006 ISO-NE Regional System Plan, or 2006 RSP), ISO-NE has recognized the problems with natural gas generation during unusually cold weather, and has taken steps to address it. For example, ISO-NE encouraged gas-only generation to convert to dual-fuel fuel oil capability prior to winter. Approximately 1,400 MW of existing capacity, those stations with existing air permits to burn oil, responded, installing the necessary hardware and performing the commissioning tests. Another aspect of the Winter 2005/2006 Action Plan was to enroll more demand

response to be available for interruption, if needed, during the winter period. Approximately 330 MW of incremental demand response was enrolled for winter 2005/2006. Additional measures, as follows, were developed and implemented to support reliable winter operations:

- Reviewing all regional natural gas pipeline-capacity contracts for gas-fired generators.
- Assessing the availability of gas-fired resources on the basis of regional temperatures and the likelihood that the gas transportation for the resource would be interrupted because higher priority contract entitlements would be exercised.
- Revising communication and contact information within the ISO's *Natural Gas Emergency Information Package*.
- Obtaining real-time information from the electronic bulletin board (EBBs) systems of the region's natural gas pipeline operating companies.
- Hosting a workshop to reinforce the coordination of winter operations and communications among the ISO and key regional stakeholders.
- Proactively coordinating winter operations with both the New York Independent System Operator (NYISO) and PJM to improve the reliability of the interconnected system overall.

Hydroelectric Power Generation

Connecticut's hydroelectric generation consists of 28 facilities contributing approximately 152 MW, or 2.2 percent of the state's current generating capacity. Hydroelectric generating facilities use a domestic, largely renewable energy source, emit zero air pollutants, and have a long operating life. Also, some hydro units have black start capability⁷. However, hydroelectric units divert river flows from worthwhile public uses, such as recreation and irrigation, and can disrupt fish and wildlife. The main obstacle to the development of additional hydroelectric generation in Connecticut is a lack of suitable sites.

FirstLight Hydro Generating Company (FLHGC) f/k/a Northeast Generation Company, Connecticut's largest provider of hydroelectric power owns the following hydroelectric facilities: Bantam, Bulls Bridge, Falls Village, Roberstville, Scotland, Stevenson, Taftville, Tunnel 1-2, Rocky River, and Tunnel 10. Table 4 shows the status of the Federal Energy Regulatory Commission (FERC) licenses for FLHGC's facilities.

Table 4

Generating Facility	Status of FERC License
Bantam 1	Not FERC Relicensed
Bulls Bridge 1-6	40 year license issued on June 23, 2004
Falls Village 1-3	40 year license issued on June 23, 2004

Robertsville 1-2	Not FERC Relicensed
Scotland 1	License expires August 31, 2012. Re-licensing to begin in 2007.
Shepaug 1	40 year license issued on June 23, 2004
Stevenson 1-4	40 year license issued on June 23, 2004
Taftville 1-5	Not FERC Relicensed
Tunnel 1-2	Not FERC Relicensed
Rocky River	40 year license issued on June 23, 2004

Solid Waste Power Generation

Connecticut currently has approximately 184 MW of solid waste-fueled generation, approximately 2.8 percent of the state's generation capacity. The Exeter generating plant in Sterling burns used tires, and has a summer rating of approximately 24 MW. The remaining 160 MW of solid waste-fueled generation includes: Bridgeport Resco; Bristol Resource Recovery Facility (RRF); Lisbon RRF; Preston RRF; Wallingford RRF; and the Connecticut Resource Recovery Agency South Meadows 5 and 6 facilities. Solid waste has the advantage of being a renewable, locally supplied fuel and it contributes to Connecticut's fuel diversity. It is not affected by market price volatility, nor supply disruptions—significant advantages over fossil fuels. In addition, the combustion of solid waste produces relatively low levels of greenhouse gases, and reduces the amount of space needed for landfills.

Recently passed federal energy legislation includes certain incentives to support the development and expansion of waste-to-energy facilities. Specifically, Title XIII of the Energy Tax Incentives Act of 2005 extends desirable tax-credit provisions until December 31, 2007. Also, an ongoing state policy initiative being administered by the Connecticut Clean Energy Fund and the DPUC—"Project 100"—already has sparked interest among developers of innovative biomass facilities fueled at least in part by waste wood from construction.

Miscellaneous Small Generation

Approximately 134 MW of electricity is generated by 67 independent entities in Connecticut such as schools, businesses, homes, etc. This portion of generation is not credited to the state's capability to meet demand because ISO-NE does not control its dispatch. However, these privately-owned units do serve to reduce the net load on the grid, particularly during periods of peak demand. They range from 5 kW to 32.5 MW in size and are fueled primarily by natural gas, with several others using oil, solid waste, hydro, solar, wind, landfill gas (essentially methane), and propane. The newest significant addition to this category is the 24.9 MW cogeneration facility at the University of Connecticut. This unit was put into service in August 2005. The installation of additional privately-owned generation in Connecticut is expected, but only by entities that view self-generation as a benefit.

OTHER GENERATION TECHNOLOGIES

Fuel Cells

A fuel cell uses separate inputs of hydrogen and oxygen in an electrochemical process that produces electricity, with water as a waste product. Fuel cells can be designed to run on natural gas. (Natural gas is mostly methane, so hydrogen can be extracted.) They have the advantages of negligible air emissions, low noise, and reliable operation. Their waste heat can be used for other purposes to further increase overall efficiency. For example, they can pre-heat domestic hot water, provide hydronic (hot water) heating, or operate an absorption air conditioning system.

Fuel cells generate direct current (DC) electricity. However, inverters can be added that convert DC current to alternating current (AC), the main type of current that flows through the transmission and distribution system.

Pursuant to CGS §16-50k(a), the Council has the legislative charge to review all fuel cell proposals. As such, the Council has reviewed and approved several fuel cell installations for various uses throughout Connecticut. The Council is currently reviewing Petition No. 810 which is a 200-kW fuel cell in Middletown.

Fuel cells can cost more per kilowatt than other generation technologies, so they are usually limited in size. Nevertheless, fuel cells are well suited for backup generation, supplemental base-load generation for buildings, and distributed generation. The Council strongly encourages the use of fuel cell technology, particularly from in-state companies.

OTHER RESOURCES THAT SUPPORT CONNECTICUT'S DEMAND

Import Capability

As noted in Table 3 (page 10), Connecticut has the ability to import a total of approximately 2,500 MW of electricity from outside the state without compromising grid voltage and system operating stability. In ISO-NE's 2005 RSP, Connecticut's import capacity was reported to be 2,300 MW. However, studies performed for the 2006 RSP have raised import limit to 2,500 MW. As such, the updated import limit is reflected in Table 3. However, of all the New England states, Connecticut is the least able to import power to supplement its internal supply resources and to access lower-cost supplies located in other states. For example, New Hampshire, Vermont, and Rhode Island have enough import capacity to support 100% of their peak load. Massachusetts and Maine each can import slightly less than 50% of their peak load. Currently, Connecticut can only import approximately 30% of its peak load. Having sufficient import capability is especially important during periods of peak demand or when a large base-load generating facility, such as Millstone, is unavailable.

High levels of east-to-west power flows in Connecticut stress the existing transmission system. To adequately address Connecticut's growing electric demand over the next ten years, Connecticut must expand its transmission infrastructure to increase its import capability and the ability to move imported power within the state. The upgrades are being considered as part of the New England East-West Solution project. This project is projected to increase import capacity to nearly 45 percent of the state's peak load. See the transmission section. The NEEWS Project is discussed further in the transmission section.

MARKET RULES AFFECTING SUPPLY

FORWARD CAPACITY MARKET

Pursuant to a settlement agreement filed with FERC on March 6, 2006, an ISO-NE press release noted it would introduce a new Forward Capacity Market (FCM) under which ISO-NE would project the needs of the power system three years in advance, then hold an annual auction to purchase power resources to satisfy those needs. New generating plants would be allowed to bid in on the same basis as existing ones, a rule that would favor alternative fuels, and, for the first time, demand response resources could bid in a form of capacity supply. Various supplemental rules would provide penalties for generators who fail to fulfill their auction commitments, and also ensure that large and small generators are treated on par.

FERC accepted the settlement agreement on June 2006. ISO-NE estimates that the first forward capacity auction could be held as early as December 2007, with resources being paid roughly 2.5 years later, in 2010. Meanwhile, a system of transition payments for capacity is in place to smooth the way as steps towards the new market begin. It is too early to tell how well the FCM will do at bringing new, more diverse generation into Connecticut and fostering growth in demand response resources, but signs have been encouraging so far.

LEGISLATION AFFECTING ELECTRIC SUPPLY

Electric Restructuring

In 1998, Public Act 98-28, "An Act Concerning Electric Restructuring" (Act) instituted historic changes to the electric system in Connecticut. Its primary provision permitted customers of Connecticut's two private investor-owned electric utilities, CL&P and UI, to choose their retail electric suppliers as of January 1, 2000. The law also allowed a municipal electric utility to engage in competitive generation supply if it reciprocally opened its service territory to other competitive retail suppliers. State-licensed independent retail generation suppliers were allowed to compete for customers. The

overall intent was that competition would lower prices for electricity, foster technological innovation, and boost supply options, while at the same time improving environmental quality.

While much of the provisions of P.A. 98-28 have been implemented, the electric market has not responded as predicted. It was expected that investment in generation would advance technological innovation and that competition would flourish thereby driving costs down. Few if no electric suppliers have materialized and the costs of delivering electricity has risen in the past eight years. The legislature has charged the DPUC to set rates not more than once per quarter for 2007 and beyond. Electric distribution companies must procure power for the “transitional standard offer” under an approved plan to reduce price volatility.

Renewable Portfolio Standards

Public Act 03-135 revised the 1998 restructuring law on the Connecticut Renewable Portfolio Standards (RPS) and required retail electric suppliers to ensure that a certain minimum percentage of their electricity comes from renewable energy sources. Legislation has divided renewable fuels into two classes, depending roughly how much pollution they cause, and their sustainability. The formula that dictates their use is complicated (see Figure 5), but the bottom line is that RPS should encourage a greater supply of electricity from more diverse sources, both goals that the Council supports.

Figure 5 depicts the required percentages for Class I⁸ and Class II⁹ renewable energy sources through 2010.

Figure 5	Renewable Portfolio Standards	
<i>Effective Date</i>	<i>Minimum Class I Percentage</i>	<i>Add'l Percentage of Class I or II</i>
1/1/2004	1 percent	3 percent
1/1/2005	1.5 percent	3 percent
1/1/2006	2 percent	3 percent
1/1/2007	3.5 percent	3 percent
1/1/2008	5 percent	3 percent
1/1/2009	6 percent	3 percent
1/1/2010	7 percent	3 percent
Source: PA 03-135		

An Act Concerning Energy Independence

On July 21, 2005, Public Act 05-1 (PA 05-1), “An Act Concerning Energy Independence”, was approved. Its purpose is to boost electric supply through a

combination of innovative means, with the incentive being relief from congestion charges, that is, charges imposed by FERC on Connecticut rate-payers in locations where demand is especially high and supply is especially low. PA 05-1 provisions that are most relevant to the Council's forecast review are discussed below.

PA 05-1 requires the DPUC to solicit proposals for reducing congestion costs during 2006-2010. Proposals can be submitted for customer-side distributed resources¹⁰, grid-side distributed resources¹¹, new generation facilities, including expanded or repowered generation, and conservation or energy efficiency agreements. Successful proposals will receive contracts for no more than 15 years for the purchase of electric capacity rights. DPUC is instructed to prefer proposals that cause the greatest aggregate reduction in federally mandated congestion charges¹²; make efficient use of existing sites and supply infrastructure; and serve the long-term interests of ratepayers.

PA 05-1 also required the DPUC to issue an RFP soliciting new or additional generation or conservation to mitigate electric demand and rates in the state. In response to the RFP issued on September 15, 2006, 80 project bid registration packages from 45 different entities were received, representing more than 8,000 MW of capacity from a full spectrum of resources, including generation, demand-side reduction, conservation and energy efficiency technologies. On April 23, 2007, the DPUC announced that it had selected four winning bidders whose projects total 787 MW. The portfolio of projects consists of: a 620 MW gas-fired combined cycle baseload plant in Middletown offered by Kleen Energy; a 66 MW oil-fired peaking facility located in Stamford offered by Waterside Power; a 96 MW gas-fired peaking facility in Waterbury offered by Waterbury Power; and a 5 MW statewide energy efficiency project offered by Ameresco. These upcoming projects are reflected in Table 3.

To facilitate the siting of electric generation, PA 05-1 permits the Council to approve by declaratory ruling:

- the construction of a facility solely for the purpose of generating electricity, other than an electric generating facility that uses nuclear materials or coal as a fuel, at a site where an electric generating facility operated prior to July 1, 2004;
- the construction or location of any fuel cell—unless the Council finds a substantial environmental effect—or of any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than 65 megawatts, so long as such the project meets the air quality standards of the Department of Environmental Protection;
- the siting of temporary generation solicited by DPUC pursuant to section 16-19ss of this act.

PA 05-1 further requires the electric utilities to submit Time-of-Use (TOU) rate plans to the DPUC, by October 2005, that provide for a combination of mandatory and voluntary rates, including peak, shoulder, off-peak and seasonal rates, and additionally, optional interruptible/ load response rates for certain C&I customers.

PA 05-1 also creates a new municipal conservation and load management program in 2006, requiring municipal electric utilities to assess a 1.0 mill per kilowatt-hour sold, with the charge increasing to 2.5 mills by January 1, 2011. The money goes into a special non-lapsing fund held by CMEEC, which must develop an annual conservation plan for member utilities.

Finally, PA 05-1 requires electric distribution companies and electric suppliers, on or after January 1, 2007, to demonstrate that no less than one percent of the total output of the suppliers or the standard service of an electric distribution company is obtained from Class III resources¹⁴, a newly-defined group of resources focusing on combined heat and power systems¹⁵ and C&LM. On January 1, 2008, this percentage increases to 2 percent. For January 1 of years 2009 and 2010, the percentages are 3 and 4 percent, respectively.

NEW GENERATION APPROVED UNDER RESTRUCTURING

New Natural Gas-fired Generation

Under Connecticut's restructured electric system, the Council has approved seven natural gas-fired electric generating facilities. These are listed below in Figure 6 with their respective nominal power outputs¹⁶ and operating status:

Figure 6	Council	Approved	Generating	Plants
<i>Company</i>	<i>Municipality</i>	<i>Operating Status</i>	<i>Deadline to Construct</i>	<i>Megawatts</i>
Bridgeport Energy, LLC	Bridgeport	Operational	N/A	520
Milford Power Company, LLC	Milford	Operational	N/A	544
NRG Northeast Generating, LLC	Meriden	Not completed	12/31/2011	544
Lake Road Generating Company, L.P.	Killingly	Operational	N/A	792
Towantic Energy, LLC	Oxford	Not completed	1/24/2011	512
PPL Wallingford Energy, LLC	Wallingford	Operational	N/A	250
Kleen Energy Systems, LLC	Middletown	Not completed	11/21/2009	620
			Total Nominal Capacity	3782
			Total Capacity in Operation	2106
			Percent Capacity in Operation	55.6

As depicted in Figure 6, the total nominal capacity of these plants is 3,782 MW. However, currently, only 2,106 MW or 56 percent of the approved capacity is now operating. Most of the delays are project-specific, but all the projects are experiencing financial vulnerability due to uncertain market conditions.

In 2003, as the process of electric restructuring continued, the legislature reconstituted the Connecticut Energy Advisory Board (CEAB), and charged it with performing a variety of functions related to energy infrastructure planning statewide¹⁷.

TRANSMISSION SYSTEM

Transmission is the “backbone” of the electric system as it transports large amounts of electricity long distances efficiently by using high voltage¹⁸. High voltages are used to minimize power loss. Since the losses are proportional to the square of the current¹⁹, and since, in general, the higher the voltage, the lesser current required, high voltages lead to more efficient power delivery.

In Connecticut, electric lines with a voltage of 69 kilovolts (kV) or more are considered transmission lines. Distribution lines are generally below 69-kV. They are the lines that come down our streets to connect²⁰ with even lower-voltage lines feeding each residence or business.

The state’s electric transmission system contains approximately: 413.1 circuit miles of 345-kV transmission; 1,300 circuit miles of 115-kV transmission; 5.8 miles of 138-kV transmission; and 99.5 circuit miles of 69-kV transmission. (These figures refer to AC transmission. The Cross Sound Cable is not counted because it is DC [see below].) Connecticut’s electric transmission system is depicted in the map in Appendix B. Appendix C shows planned new transmission, reconductoring, or upgrading of existing lines to meet load growth and/or system operability needs.

The majority of Connecticut’s electric transmission, as noted above, is 115-kV. CL&P’s remaining AC transmission is rated between 69-kV and 138-kV. The 138-kV transmission line connects Norwalk, Connecticut to Long Island via an underwater cable. In addition, CL&P has 13 ties (connections) with CMEEC, twenty with UI, and nine interstate connections. Of these interstate connections, one tie is with National Grid in Rhode Island; one tie is with Central Hudson in New York state; and five ties are with the Western Massachusetts Electric Company (WMECO) in Massachusetts.

The CL&P 345-kV transmission system transmits power from large central generating stations such as Millstone, Lake Road, and Middletown #4 via four 345-kV transmission ties with neighboring utilities. This includes one tie with UI, as well as three ties that cross the state line to connect with: National Grid in Rhode Island, WMECO in Massachusetts, and Consolidated Edison in New York State.

NEW ENGLAND EAST – WEST SOLUTION

In 2006, National Grid and CL&P identified a transmission upgrade project known as the New England East – West Solution (NEEWS). NEEWS would include a new 345-kV transmission line connecting National Grid’s service territory in Massachusetts and Rhode Island with CL&P’s service territory to increase the east-west power transfer capability across New England. While an exact route is not currently defined, this new line is expected to tie National Grid’s Milbury Substation in Massachusetts to CL&P’s Card Street Substation in Lebanon.

NEEWS also includes new and modified 115-kV and new 345-kV transmission facilities, including a new 345-kV transmission line connecting Connecticut and western Massachusetts to address reliability problems in the Springfield, Massachusetts area. The new 345-kV facilities are expected to connect the Western Massachusetts Electric Company's (WMECO) Agawam Substation with CL&P's North Bloomfield Substation in Bloomfield.

New and modified 115-kV and new 345-kV transmission facilities would address reliability problems associated with the transfer of power from eastern Connecticut to western and southern Connecticut also as part of the NEEWS project. The currently planned connection points for a new 345-kV transmission line are North Bloomfield Substation in Bloomfield and Frost Bridge Substation in Watertown.

New and modified 115-kV and new 345-kV transmission facilities would address reliability problems associated with Rhode Island's limited access to the 345-kV transmission system and over-dependence on local generation. This portion of the NEEWS project would be located inside Rhode Island and would be constructed by National Grid.

The ISO-NE technical approval process is scheduled to be completed in 2007. CL&P expects the aggregate of the Southern New England transmission reinforcements to significantly increase the import capacity into Connecticut, with estimates ranging from 1,100 MW to 1,700 MW. (Table 1 on page 10 assumes 1,100 MW to be conservative.) It is anticipated that the application(s) for this project will be submitted to the Council approximately January 2008.

ELECTRIC TRANSMISSION IN SOUTHWEST CONNECTICUT

The most critical and constrained transmission area in the state, as well as New England, is a 54 town region referred to as Southwest Connecticut (SWCT), including all of UI's service territory. This area is essentially west of Interstate 91 and south of Interstate 84. It accounts for approximately one-half the state's peak load, and is one of the fastest growing and economically vital areas of the state. The 115-kV lines that serve SWCT have reached the limit of their ability to support the area's current and projected loads reliably and economically.

Within SWCT, a critical sub-area is called the Norwalk-Stamford Sub-Area. Historically, Norwalk and Stamford have relied on local generation. Since generation has become less predictable, given electric restructuring, and given the age of generating plants around Norwalk and Stamford, the Norwalk-Stamford Sub-Area has had to look at transmission, rather than generation, to meet its needs.

ISO-NE, CL&P, and UI devised a plan to supplement the existing 115-kV transmission lines with a new 345-kV "loop" through SWCT that would integrate the area better with the 345-kV system in the rest of the state and New England, and provide electricity more efficiently.

The first phase of this proposed upgrade (known as “Phase One”), involves the construction of a 345-kV transmission line from Plumbtree Substation in Bethel to the Norwalk Substation in Norwalk. The Phase One proposal was the subject of Council Docket No. 217, approved by the Council on July 14, 2003. Construction is complete, and the line was activated in October 2006.

The second phase of the upgrade (known as “Phase Two”) was the subject of Council Docket No. 272. This proposal includes the construction of a 345-kV transmission line from Middletown to Norwalk Substation. This project was approved by the Council on April 7, 2005. Construction began in 2006 and is expected to finish by year-end 2009.

Glenbrook-Norwalk Cable Project

In Docket No. 292, the Council approved the construction of two new 115-kV underground transmission cables between the Norwalk Substation in Norwalk and the Glenbrook Substation in Stamford. This project will effectively bring the reliability benefits of the new 345-kV transmission loop to the large load center in Stamford. The project is presently under construction and is scheduled to be in service in 2008.

ELECTRIC TRANSMISSION IN NORTHEAST CONNECTICUT

Lake Road Generating Facility

Currently, the Lake Road generating facility (approximately 693 MW summer rating) in Killingly is not counted towards Connecticut’s generation capacity. The reason is that only one 345-kV line connects the plant with the nearest substation—Card Street Substation in Lebanon: if this line were to go down, the plant would be disconnected from Connecticut’s 345-kV transmission system.

Another way to look at this is that the 345-kV transmission line that connects Lake Road to Card Substation, like any transmission line, can only transport so much power. Thus, if the Lake Road facility is off-line, Connecticut could import additional power from Rhode Island to compensate. If the Lake Road facility is on-line, Connecticut would import less power from Rhode Island. Thus, the capacity afforded by Lake Road would benefit Rhode Island, but would not change the maximum of current that can be sent to Card Substation. To remedy this situation, CL&P is actively reviewing solutions that, if implemented, would allow ISO-NE to classify Lake Road as Connecticut generation.

INTERIM MEASURES TO ADDRESS TRANSMISSION CONSTRAINTS IN SWCT

ISO-NE Gap RFP

To help address the needs of SWCT before transmission solutions are complete, ISO-NE has issued RFP awards for several temporary emergency generators, and has instituted new demand response programs to reduce load. As depicted in Table 3 (see page 10), the ISO-NE RFP award measures are assumed to remain in place through approximately 2008.

Figure 7	ISO-NE	Emergency	Resources	for SWCT
Technology	2004 Summer MW	2005 Summer MW	2006 Summer MW	2007 Summer MW
On-Peak Conservation	1	4	5	5
Emergency Generation	94	153	154	154
Load Reduction	21	53	74	74
Combined Energy and Load Reduction	3	12	22	27
Total	119	222	255	260

Source: Council Docket F-2004

SYSTEM CONTINGENCIES AND RESERVE REQUIREMENTS

Planners estimate the electric system's emergency needs for reserve power by hypothesizing the loss of a major transmission line or generator. To ensure system reliability, the loss, called a "contingency", must be replaced by another line or other generation in a relatively short period of time. (Generation that can be brought online in 30 minutes or less is called quick-start generation.)

The single largest contingency currently in Connecticut is the Millstone 3 generating facility, with a summer output of 1,155 MW. Thus, in its 2006 RSP (with rounding to the nearest 100 MW), ISO-NE estimates 1,200 MW as the reserve requirement. This forecast's Table 3 (see page 10) uses the same requirement.

Contingency planning is also done for each region of the state - for example, SWCT. Both the Phase One and Phase Two projects increase the import capacity into SWCT. By the time the Phase Two transmission project is complete and placed into service in approximately late 2009, it will become the region's largest contingency. Thus, significant quick-start generation will be needed in SWCT.

According to the 2006 RSP, approximately 75 MW to 175 MW of additional resources will be required to meet the summer operating-reserve requirement for SWCT for 2007. ISO-NE also projects that up to 540 MW of additional quick-start resources could be needed for Connecticut as a whole to meet the current 1,200 MW requirement for operating reserves.

SUBSTATIONS AND SWITCHING STATIONS

An electric substation is an area or group of equipment containing switches, circuit breakers, buses, and transformers for switching power circuits and to transform power from one voltage to another or from one system to another. For example, to connect the 345-kV transmission system with the 115-kV transmission system, a substation containing transformer(s) that convert 345-kV to 115-kV is required. An example is the Killingly 2G Substation, which is discussed below.

On May 11, 2005, the Council approved the Northeast Connecticut Reliability Project as Docket No. 302. This project includes the construction of a new 345-kV/115-kV substation (known as Killingly 2G Substation) on CL&P property straddling the Killingly/Putnam town line. The new substation will connect to an existing overhead 345-kV transmission line, then use that source to feed into two existing overhead 115-kV transmission lines. This project is expected to alleviate transmission capacity constraints and improve electric system reliability in this region of the state. This currently in service.

Another type of substation that is very common is one that connects to the transmission system and supplies the distribution system. For example, the input might be 115-kV transmission and the output might be 13.8-kV distribution. The Council recently approved this type of substation in the Town of Wilton in Docket No. 311.

Another type of substation would be used to connect a generator to the grid. Generators often have an output voltage that is less than the transmission voltage. Thus, the generator's output voltage has to be raised to the transmission voltage before the power generated can be fed into the grid. Lastly, a switching station is a facility where transmission lines are connected without power transformers.

As depicted in Figure 8, as many as ten new substations are planned for the next four years to address high load areas within the state. Some of the substations are associated with the 345-kV transmission projects in SWCT. Others are associated with local load growth. Other additional substations are being considered, with the estimated in-service dates to be determined.

Figure 8: Planned Substation Projects	Est. In-Service Date	Company
Install the new 345-kV Kleen Substation in Middletown	TBD ²¹	CL&P
Modify the existing 115-kV Barbour Hill Substation in South Windsor	2007	CL&P
Modify the existing Triangle Substation in Danbury	2007	CL&P
Modify the existing 115-kV Middle River Substation in Danbury	2007	CL&P
Expand the existing 115-kV Plumtree Substation in Bethel	2007	CL&P
Install the new 115-kV Wilton Substation in Wilton	2008	CL&P
Modify the existing 115-kV Norwalk Substation in Norwalk	2008	CL&P

Modify the existing 115-kV Glenbrook Substation in Stamford	2008	CL&P
Modify the existing 138-kV / 115-kV Norwalk Harbor Substation in Norwalk	2008	CL&P
Modify the existing 115-kV Flax Hill Substation in Norwalk	2008	CL&P
Install the new 115-kV Oxford Substation in Oxford	2008	CL&P
Modify the existing 115-kV Cedar Heights Substation in Stamford	2008	CL&P
Modify the existing 345-kV / 115-kV Barbour Hill Substation in South Windsor	2008	CL&P
Modify the existing 115-kV Enfield Substation in Enfield	2008	CL&P
Modify the existing Cos Cob Substation in Stamford	2009	CL&P
Modify the existing 115-kV Devon Substation in Milford	2009	CL&P
Install the new 345-kV / 115-kV East Devon Substation in Milford	2009	CL&P
Modify the existing 345-kV Norwalk Substation in Norwalk	2009	CL&P
Modify the existing 345-kV Beseck Switching Station in Wallingford	2009	CL&P
Modify the existing 345-kV Card Substation in Lebanon	2009	CL&P
Modify the existing 345-kV Millstone Substation in Waterford	2009	CL&P
Install the new 115-kV Stepstone Substation in Guilford	2009	CL&P
Install the new 115-kV Windsor Substation in Windsor	2009	CL&P
Modify the existing 115-kV North Bloomfield Substation in Bloomfield	2009	CL&P
Install the new 345-kV Singer Substation in Bridgeport	2009	UI
Modify the existing 115-kV Pequonnock Substation in Bridgeport	2009	UI
Install the new 115-kV Waterford Substation in Waterford	2010	CL&P
Install a new 115-kV substation in Shelton	2010	UI
Install the new Pequonnock 115-kV Duty Mitigation Project	2011	UI
Install a new 115-kV substation in Fairfield	2012	UI
Install the Naugatuck Valley 115-kV Reliability Improvement Project	2012	UI
Install the Grand Avenue 115-kV Rebuild Project	2012	UI
Install a new 115-kV substation in Orange	2013	UI
Install a new 115-kV substation in Hamden	2014	UI
Install a new 115-kV substation in North Branford	2016	UI
Modify the existing 345-kV / 115-kV Haddam Substation	TBD	CL&P
Modify the existing 345-kV Millstone Substation in Waterford	TBD	CL&P
Modify the existing 345-kV Card Substation in Lebanon	TBD	CL&P
Modify the existing 345-kV Lake Road Substation in Killingly	TBD	CL&P
Install the new 345-kV Willimantic Road Switching Substation	TBD	CL&P
Modify the existing 345-kV Killingly Substation in Killingly	TBD	CL&P
Modify the existing 115-kV Glenbrook Substation in Stamford	TBD	CL&P
Modify the existing 115-kV Norwalk Harbor Substation in Norwalk	TBD	CL&P
Modify the existing 115-kV Frost Bridge Substation in Watertown	TBD	CL&P
Modify the existing 345-kV North Bloomfield Substation in Bloomfield	TBD	CL&P
Modify the existing 115-kV East Hartford Substation in East Hartford	TBD	CL&P
Modify the existing 115-kV Northwest Hartford Substation in Hartford	TBD	CL&P
Modify the existing 115-kV Southwest Hartford Substation in Hartford	TBD	CL&P
Modify the existing 115-kV South Meadow Substation in Hartford	TBD	CL&P
Modify the existing 115-kV Riverside Drive Substation in East Hartford	TBD	CL&P
Modify the existing 345-kV Manchester Substation in Manchester	TBD	CL&P
Install the existing 115-kV Westport Substation in Westport	TBD	CL&P
Install the existing 115-kV Goshen Substation in Goshen	TBD	CL&P
Modify the existing 115-kV Bunker Hill Substation in Waterbury	TBD	CL&P

Because new transmission lines or new substation and switching facilities may be considered undesirable by local communities, utilities must carefully assess supply locations, load center demands, and the need for new or upgraded facilities far in advance of actual construction. In addition to anticipating these technical questions, the companies must deal with concerns about electric and magnetic fields, aesthetics, and environmental impacts as they evaluate suitable sites.

RESOURCE PLANNING

The Council fully endorses and participates in initiatives to maintain electric reliability, including programs such as C&LM, resource modeling, and transmission planning. The need to coordinate these efforts has substantially increased as growing demand has stressed existing resources; at the same time, because of electric restructuring, the overall task of matching supply to demand has become more complex. Rate pressures, congestion management, targeted demand side programs, regional transfers, and scarce locations for siting facilities are only a few of the issues that are making the Council's decisions difficult and critical.

As depicted in Appendix B, the Council continues to assess the existing electric system to maintain and improve reliability. Further, the Council notes the CEAB's legislated mandate for stimulating alternatives to proposed electric facilities that come before the Council. Such alternatives may include new transmission technologies, generation using renewable fuels, distributed generation, wholesale and retail market strategies, CEEF, and combinations thereof. The Council encourages innovation. In order for regulators to work well, they must look at multiple scenarios, and consider diverse solutions. The future never sits still.

CONCLUSION

This forecast review has considered Connecticut's electric energy future for the next ten years and concludes that supplies are expected to meet demand in the near term under normal weather conditions assuming no losses of generation due to retirement. However, under the more stringent ISO-NE "90/10" forecast, Connecticut faces a significant shortage of supply, even including the three approved generating facilities not yet constructed and/or completed.

Accordingly, steps are being taken to address the electric system's issues. The Phase I transmission upgrade is complete, and Phase II is under construction. The NEEWS project, under review by utility planners, also addresses regional reliability needs and would increase electric supply in Connecticut through import capacity. Additional generation and/or load reduction is expected to result from the DPUC's RFP process as outlined in the Energy Independence Act.

Issues that warrant attention in the future include:

- maintain sufficient emergency generation and demand response in SWCT until the Phase II transmission upgrade is completed;
- facilitate the addition of new generation in Connecticut, and address delays in construction of approved generation;
- continue to explore options to allow all or some of Lake Road Generating Station's capacity to be considered Connecticut capacity;
- consider additional interstate transmission resources that will allow additional transfer capability into Connecticut;
- be proactive regarding the deactivation/retirement of older generating facilities in the context of electric system needs;
- encourage conservation and demand response;
- avoid excessive reliance on any one fossil fuel for generation; and
- encourage innovations.

End Notes

1. CGS §16-50r states, “(a) Every person engaged in electric transmission services, as defined in section 16-1, electric generation services, as defined in said section, or electric distribution services, as defined in said section generating electric power in the state utilizing a generating facility with a capacity greater than one megawatt, shall, annually, on or before March first, file a report on a forecast of loads and resources which may consist of an update of the previous year's report with the council for its review. The report shall cover the ten-year forecast period beginning with the year of the report. Upon request, the report shall be made available to the public. The report shall include, as applicable: (1) A tabulation of estimated peak loads, resources and margins for each year; (2) data on energy use and peak loads for the five preceding calendar years; (3) a list of existing generating facilities in service; (4) a list of scheduled generating facilities for which property has been acquired, for which certificates have been issued and for which certificate applications have been filed; (5) a list of planned generating units at plant locations for which property has been acquired, or at plant locations not yet acquired, that will be needed to provide estimated additional electrical requirements, and the location of such facilities; (6) a list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed; (7) a description of the steps taken to upgrade existing facilities and to eliminate overhead transmission and distribution lines in accordance with the regulations and standards described in section 16-50t; and (8) for each private power producer having a facility generating more than one megawatt and from whom the person furnishing the report has purchased electricity during the preceding calendar year, a statement including the name, location, size and type of generating facility, the fuel consumed by the facility and the by-product of the consumption. Confidential, proprietary or trade secret information provided under this section may be submitted under a duly granted protective order. The council may adopt regulations, in accordance with the provisions of chapter 54, that specify the expected filing requirements for persons that transmit electric power in the state, electric distribution companies, and persons that generate electric power in the state utilizing a generating facility with a capacity of greater than one megawatt. Until such regulations are adopted, persons that transmit electric power in the state shall file reports pursuant to this section that include the information requested in subdivisions (6) and (7) of this subsection; electric distribution companies in the state shall file reports pursuant to this section that include the information requested in subdivisions (1), (2), (7) and (8) of this subsection; persons that generate electric power in the state utilizing a generating facility with a capacity greater than one megawatt shall file reports pursuant to this section that include the information requested in subdivisions (3), (4), (5) and (8) of this subsection. The council shall hold a public hearing on such filed forecast reports annually. The council shall conduct a review in an executive session of any confidential, proprietary or trade secret information submitted under a protective order during such a hearing. At least one session of such hearing shall be held after six-thirty p.m. Upon reviewing such forecast reports, the council may issue its own report assessing the overall status of loads and resources in the state. If the council issues such a report, it shall be made available to the public and shall be furnished to each member of the joint standing committee of the General Assembly having cognizance of matters relating to energy and technology, any other member of the General Assembly making a written request to the council for the report and such other state and municipal bodies as the council may designate.”
2. Household electric energy consumption is generally stated in kilowatt-hours, which is the equivalent of operating a one-thousand watt load (ten light bulbs of 100 watts each, for example) for one hour. On a statewide scale, a larger unit called a gigawatt-hour is used. One gigawatt-hour (GWh) is the equivalent of operating a one billion watt load for an hour.
3. Electric load can be thought of as the rate at which electricity is consumed. In utility forecasting and planning, electric loads are generally rated in megawatts. One megawatt (MW) represents an electric load of one million watts. This is the electric load equivalent of operating 10,000 light bulbs of 100 watts each simultaneously. Electric loads vary with time depending on demand. Utility forecasting considers the peak load, which is the highest load experienced during the year.

4. The ten-year forecast period is from 2007 through 2016. However, Figure 2 includes past peak loads from the year 2002 to give the reader a longer term picture of the past electric loads. In addition, the statute requires five years of historical data, as well as ten years of projected data.
5. The historical temperatures data for CL&P's forecast is measured at Bradley International Airport in Windsor Locks.
6. The electric power outputs for generating plants have both a summer and winter rating, referred to as seasonal claimed capability (SCC). SCC ratings are the maximum dependable load-carrying ability, expressed in megawatts, of a generating unit or units, excluding the capacity required for the power station's own use. SCC ratings are computed per ISO-NE's rule "M-20" for installed capacity and correspond to the power generating capacities at 20 degrees F and 90 degrees F ambient temperatures for the winter and summer ratings, respectively. The SCC for a given generating facility that may be claimed by the New England Power Pool must be verified by conducting a claimed capacity audit. Generally, fossil-fueled plants have a higher SCC rating in the winter than the summer.
7. Black start capability (BSC) is the ability of a generating station to start and commence generation without any outside source of electricity. (For example, a power plant with BSC may have its own on-site diesel generators that can start under battery power and then produce electricity in order to start the main generating units.) ISO-NE audits BSC and determines which plants would have this capability. Certain hydroelectric plants inherently have this capability due to the natural water flow and their design. In the event of a major blackout, units without BSC that have been shut down are dependent on outside grid power to restart.
8. Class I renewable energy sources are defined as follows: "(A) energy derived from solar power, wind power, a fuel cell, methane gas from landfills, ocean thermal power, wave or tidal power, low emission advanced renewable energy conversion technologies, a run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the river flow, and began operation after the effective date of this section, or a biomass facility, including, but not limited to, a biomass gasification plant that utilizes land clearing debris, tree stumps or other biomass that regenerates or the use of which will not result in a depletion of resources, provided such biomass is cultivated and harvested in a sustainable manner and the average emission rate for such facility is equal to or less than .075 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter except that energy derived from a biomass facility with a capacity of less than five hundred kilowatts that began construction before July 1, 2003, may be considered a Class I renewable energy source, provided such biomass is cultivated and harvested in a sustainable manner, or (B) any electrical generation, including distributed generation, generated from a Class I renewable energy source."
9. Class II renewable energy sources are defined under PA 03-135 as "energy derived from a trash-to-energy facility, a biomass facility that began operation before July 1, 1998, provided the average emission rate for such facility is equal to or less than 0.2 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter, or a run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the riverflow, and began operation prior to the effective date of this section."
10. Customer-side distributed resources are defined under PA 05-1 as "the generation of electricity from a unit with a rating of not more than sixty-five megawatts on the premises of a retail end user within the transmission and distribution system including, but not limited to, fuel cells, photovoltaic systems or small wind turbines, or a reduction in demand for electricity on the premises of a retail end user in the distribution system through methods of conservation and load management, including, but not limited to, peak reduction systems and demand response systems."

11. Grid-side distributed resources are defined under PA 05-1 as “the generation of electricity from a unit with a rating of not more than sixty-five megawatts that is connected to the transmission or distribution system, which units may include, but are not limited to, units used primarily to generate electricity to meet peak demand.”
12. Federally mandated congestion charges are defined under PA 05-1 as “any cost approved by the Federal Energy Regulatory Commission as part of New England Standard Market Design including, but not limited to, locational marginal pricing, locational installed capacity payments, any cost approved by the Department of Public Utility Control to reduce federally mandated congestion charges in accordance with this section, sections 16-99ss, 16-32f, 16-50i, 16-50k, 16-50x, 16-244c, 16-244e, 16-245m, and 16-245n, as amended by this act, and sections 8 to 17, inclusive, and 20 and 21 of this act and reliability must run contracts.”
13. The rate schedule is 1.0 mills on and after January 1, 2006; 1.3 mills on and after January 1, 2007; 1.6 mills on and after January 1, 2008; 1.9 mills on and after January 1, 2009; 2.2 mills on and after January 1, 2010; and 2.5 mills on and after January 1, 2011.
14. Class III renewable energy sources are defined under PA 05-1 as “the electricity output from combined heat and power systems with an operating efficiency level of no less than fifty percent that are part of customer-side distributed resources developed at commercial and industrial facilities in this state on or after January 1, 2006, or the electricity savings created at commercial and industrial facilities in this state from conservation and load management programs begun on or after January 1, 2006.”
15. Combined heat and power systems are defined under PA 05-1 as “a system that produces, from a single source, both electric power and thermal energy used in any process that results in an aggregate reduction in energy use.”
16. The nominal power outputs are those reported in their respective applications to the Council. The actual power outputs of active plants vary seasonally. See Appendix A.
17. CGS § 16a-3(b) states that “The Board shall, (1) prepare an annual report pursuant to section 17 of this act; (2) represent the state in regional energy system planning processes conducted by the regional independent system operator, as defined in section 16-1; (3) encourage representatives from the municipalities that are affected by a proposed project of regional significance to participate in regional energy system planning processes conducted by the regional independent system operator; (4) issue a request-for-proposal in accordance with subsections (b) and (c) of section 19 of this act; (5) evaluate the proposals received pursuant to the request-for-proposal in accordance with subsection (f) of section 19 of this act; (6) participate in a forecast proceeding conducted pursuant to subsection (a) of section 16-50r; and participate in a life-cycle proceeding conducted pursuant to subsection (b) of section 16-50r.”
18. Voltage can be thought of as electrical “pressure.”
19. Electric current can be thought of, by analogy to water, as “flow.” In a water system, the rate of flow (“flow rate”) of water through a pipe is measured in gallons per minute. In an electric system, the flow rate of electrons through a wire is measured in amperes.
20. The distribution lines connect to the wires supplying a home or business via a transformer. The transformer drops the voltage from the distribution level to that required by the end user.
21. The Kleen Energy Switching Station associated with the proposed Kleen Energy Plant has been delayed because construction of the plant has not commenced at this time.

Appendix A **Existing Electric Generation Facilities** **as of June, 2007**

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
AES Thames	AES Thames, Inc.	Montville	Coal/Oil	181.00	182.15	12/1/1989
Aetna Capitol District	Capitol District Energy Ctr.	Hartford	Gas/Oil	55.25	61.33	11/1/1988
Bantam #1	FirstLight Hydro Generating Co.	Litchfield	Hydro	0.32	0.32	11/1/1905
Branford #10	NRG	Branford	Oil	15.84	20.95	11/1/1969
Bridgeport Energy	Bridgeport Energy LLC	Bridgeport	Gas	447.87	527.12	8/1/1998
Bridgeport Harbor #2	PSEG Power, LLC	Bridgeport	Oil	130.50	147.51	8/1/1961
Bridgeport Harbor #3	PSEG Power, LLC	Bridgeport	Coal/Oil	372.21	370.37	8/1/1968
Bridgeport Harbor #4	PSEG Power, LLC	Bridgeport	Oil	9.92	14.72	10/1/1967
Bridgeport Resco	CRRA	Bridgeport	Refuse	58.52	58.74	4/1/1988
Bristol RRF	Ogden Martin Systems-CT	Bristol	Refuse/Oil	13.20	12.74	5/1/1988
Bulls Bridge #1 - #6	FirstLight Hydro Generating Co.	New Milford	Hydro	8.40	8.40	11/1/1903
Dexter	Aistom	Windsor Locks	Gas/Oil	38.00	39.00	5/1/1990
Colebrook	MDC	Colebrook	Hydro	1.55	1.55	3/1/1988
Cos Cob #10	NRG	Greenwich	Oil	17.18	22.08	9/1/1969
Cos Cob #11	NRG	Greenwich	Oil	18.24	23.23	11/1/1969
Cos Cob #12	NRG	Greenwich	Oil	18.44	23.34	11/1/1969
Dayville Pond	Summit Hydro Power	Killingly	Hydro	0.06	0.10	3/1/1995
Derby Dam	McCallum Enterprises	Shelton	Hydro	7.05	7.05	3/1/1989
Devon #7	NRG	Milford	Oil/Gas	0.00	0.00	11/1/1956
Devon #10 (reactivated)	NRG	Milford	Oil	15.27	19.21	4/1/1988
Devon #11	NRG	Milford	Gas/Oil	29.58	39.10	10/1/1996
Devon #12	NRG	Milford	Gas/Oil	29.24	38.45	10/1/1996
Devon #13	NRG	Milford	Gas/Oil	30.76	39.76	10/1/1996
Devon #14	NRG	Milford	Gas/Oil	29.75	40.33	10/1/1996
Exeter	Oxford Energy, Inc.	Sterling	Tires/Oil	24.17	25.66	12/1/1991
Falls Village #1 - #3	FirstLight Hydro Generating Co.	Canaan	Hydro	7.68	7.57	11/1/1914
Franklin Drive #10	NRG	Torrington	Oil	15.42	20.53	11/1/1968
Glen Falls	Summit Hydro Power	Plainfield	Hydro	0.00	0.00	3/1/1998
Goodwin Dam	MDC	Hartland	Hydro	3.00	3.00	2/1/1986
Hartford Landfill	CRRA	Hartford	Methane	1.90	1.90	8/1/1998
Kinneytown A	Kinneytown Hydro Co.	Ansonia	Hydro	0.00	0.00	3/1/1988
Kinneytown B	Kinneytown Hydro Co.	Seymour	Hydro	1.29	1.51	11/1/1986
Lake Road #1	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.75	268.37	7/1/2001

Appendix A **Existing Electric Generation Facilities** **as of June, 2007**

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Lake Road #2	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.80	268.43	1/1/12001
Lake Road #3	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	248.72	284.35	5/1/2002
Lisbon RRF	Riley Energy Systems	Lisbon	Refuse	12.96	13.04	1/1/1996
Mechanicsville	Saywatt Hydro Associates	Thompson	Hydro	0.14	0.27	9/1/1995
Middletown #2	NRG	Middletown	Oil/Gas	117.00	120.00	1/1/1958
Middletown #3	NRG	Middletown	Oil/Gas	236.00	245.00	1/1/1964
Middletown #4	NRG	Middletown	Oil	400.00	402.00	6/1/1973
Middletown #10	NRG	Middletown	Oil	17.12	22.02	1/1/1966
Milford Power #1	Milford Power Company, LLC	Milford	Gas/Oil	239.00	267.24	2/12/2004
Milford Power #2	Milford Power Company, LLC	Milford	Gas/Oil	253.09	287.63	6/1/2004
Millstone #2	Dominion Nuclear CT, Inc.	Waterford	Nuclear	879.84	881.96	12/1/1975
Millstone #3	Dominion Nuclear CT, Inc.	Waterford	Nuclear	1155.00	1155.48	4/1/1986
Montville #5	NRG	Montville	Oil/Gas	81.00	81.59	1/1/1954
Montville #6	NRG	Montville	Oil	407.40	409.91	7/1/1971
Montville #10 & #11	NRG	Montville	Oil	5.30	5.35	1/1/1967
New Haven Harbor #1	PSEG Power, LLC	New Haven	Oil/Gas	447.89	454.64	8/1/1975
New Milford Landfill	Vermont Electric Power Co.	New Milford	Methane/Oil	1.61	1.61	8/1/1991
Norwalk Harbor #1	NRG	Norwalk	Oil	162.00	164.00	1/1/1960
Norwalk Harbor #2	NRG	Norwalk	Oil	168.00	172.00	1/1/1963
Norwalk Harbor #10 (3)	NRG	Norwalk	Oil	11.93	17.13	10/1/1996
Norwich 2nd St./Greenville Dam	CMEEC	Norwich	Hydro	0.80	0.80	10/1/1998
Norwich 10th St.	CMEEC	Norwich	Hydro	0.98	1.21	1/1/1966
Norwich Jet	CMEEC	Norwich	Oil	15.26	18.80	9/1/1972
Pinchbeck	William Pinchbeck, Inc.	Guilford	Wood	0.01	0.01	7/1/1987
PPL Wallingford Unit #1	PPL EnergyPlus, LLC	Wallingford	Gas	43.50	48.95	8/1/2001
PPL Wallingford Unit #2	PPL EnergyPlus, LLC	Wallingford	Gas	41.37	52.37	8/1/2001
PPL Wallingford Unit #3	PPL EnergyPlus, LLC	Wallingford	Gas	43.53	48.43	8/1/2001
PPL Wallingford Unit #4	PPL EnergyPlus, LLC	Wallingford	Gas	43.35	48.64	8/1/2001
PPL Wallingford Unit #5	PPL EnergyPlus, LLC	Wallingford	Gas	42.57	53.57	8/1/2001
Preston RRF	SCRFF	Preston	Refuse/Oil	16.01	16.51	1/1/1992
Putnam	Putnam Hydropower, Inc.	Putnam	Hydro	0.52	0.58	10/1/1987
Quinebaug	Quinebaug Associates LLC	Killingly	Hydro	1.03	1.30	9/1/1990
Rainbow Dam	Farmington River Power Co.	Windsor	Hydro	8.20	8.20	1/1/1980

Appendix A **Existing Electric Generation Facilities** **as of June, 2007**

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Robertsville #1 - #2	Firstlight Hydro Generating Co.	Colebrook	Hydro	0.60	0.62	1/1/1924
Rocky Glen/Sandy Hook Hydro	Rocky Glen Hydro LP	Newtown	Hydro	0.11	0.11	4/1/1989
Rocky Glen	Firstlight Hydro Generating Co.	New Milford	Hydro-pump strg.	29.35	29.00	1/1/1928
Scotland #1	Firstlight Hydro Generating Co.	Windham	Hydro	2.20	2.20	1/1/1937
Shepaug #1	Firstlight Hydro Generating Co.	Southbury	Hydro	41.51	42.56	1/1/1955
South Meadow #5	CRRA	Hartford	Refuse	25.60	29.21	11/1/1987
South Meadow #6	CRRA	Hartford	Refuse	27.11	28.12	11/1/1987
South Meadow #11	CRRA	Hartford	Oil	35.78	46.92	8/1/1970
South Meadow #12	CRRA	Hartford	Oil	37.70	47.87	8/1/1970
South Meadow #13	CRRA	Hartford	Oil	38.32	47.92	8/1/1970
South Meadow #14	CRRA	Hartford	Oil	36.75	46.35	8/1/1970
Stevenson #1 - #4	Firstlight Hydro Generating Co.	Monroe	Hydro	28.31	28.90	1/1/1919
Taftville #1 - #5	Firstlight Hydro Generating Co.	Norwich	Hydro	2.03	2.03	1/1/1906
Torrington Terminal #10	NRG	Torrington	Oil	15.64	20.75	8/1/1967
Toutant	Toutant Hydro Power, Inc.	Putnam	Hydro	0.40	0.40	2/1/1994
Tunnel #1 - #2	Firstlight Hydro Generating Co.	Preston	Hydro	2.10	2.10	1/1/1919
Tunnel #10	Firstlight Hydro Generating Co.	Preston	Oil	15.89	20.76	1/1/1969
Wallingford RRF	CRRA	Wallingford	Refuse/Oil	6.35	6.90	3/1/1989
Waterside Power	Waterside Power	Stamford	Oil	72.00	72.00	10/1/2006
Willimantic #1	Willimantic Power Corp.	Willimantic	Hydro	0.77	0.77	6/1/1990
Willimantic #2	Willimantic Power Corp.	Willimantic	Hydro	0.77	0.77	6/1/1990
Wyre Wynd	Summit Hydro Power	Griswold	Hydro	2.49	2.78	4/1/1997
	Seasonal Claimed Capability of coal fired plants			553.21	552.52	
	Seasonal Claimed Capability of natural gas fired plants			1366.86	1591.92	
	Seasonal Claimed Capability of oil fired plants			2561.79	2634.59	
	Seasonal Claimed Capability of hydroelectric plants			151.66	154.10	
	Seasonal Claimed Capability of methane fired plants			3.51	3.51	
	Seasonal Claimed Capability of nuclear plants			2034.84	2037.44	
	Seasonal Claimed Capability of refuse fueled plants (inc. tires)			183.92	190.92	
	Seasonal Claimed Capability of wood fired plants			0.01	0.01	
Total Seasonal Claimed Capability available for dispatch to the grid.				6855.80	7237.00	

Appendix A **Existing Electric Generation Facilities** **as of June, 2007**

	(Lake Road is excluded from the total.)								
Facility (self generation)	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date			
Connecticut Valley Hospital	State of Connecticut	Middletown	Oil	2.05	2.05	5/9/1999			
Fairfield Hills Hospital	Fairfield Hills Hospital	Newtown	Oil	3.95	3.95	5/9/1999			
Federal Paper Board	Federal Paper Board	Sprague	Oil	9.00	9.00	5/9/1999			
Fishers Island Elec. Co.	Fishers Island Elec. Co.	Groton	Oil	1.10	1.10	1/1/1965			
Groton Sub Base	U.S. Navy	Groton	Oil/Gas	18.50	18.50	1/1/1966			
Locite	Locite	Rocky Hill	Gas	1.18	1.18	4/1/1994			
Norwalk Hospital	Norwalk Hospital	Norwalk	Gas	2.36	2.36	1/1/1992			
Norwich State Hospital	Norwich State Hospital	Norwich	Oil	2.00	2.00	5/9/1999			
Pfizer #1	Pfizer	Groton	Oil	32.50	32.50	1/1/1948			
Pratt & Whitney	UTC	E. Hartford	Gas	23.80	23.80	4/1/1992			
Pratt & Whitney	UTC	Middletown	Oil	1.00	1.00	5/9/1999			
Smurfit-Stone Container Co.	Smurfit-Stone Container Co.	Montville	Refuse	2.00	2.00	9/1/1989			
Southbury Training School	State of Connecticut	Southbury	Oil	1.50	1.50	5/9/1999			
University of Conn. COGEN	State of Connecticut	Mansfield	Gas/Oil	24.90	24.90	8/1/2005			
	Total Natural Gas Fired Generation less than 1 MW each			4.42	4.42				
	Total Propane Fired Generation less than 1 MW each			0.03	0.03				
	Total Hydroelectric Generation less than 1 MW each			3.33	3.33				
	Total Methane Fueled Generation less than 1 MW each			0.13	0.13				
	Total Solar (photovoltaic) Generation less than 1 MW each			0.15	0.15				
	Total Wind Powered Generation less than 1 MW each			0.04	0.04				
	Total Oil Fired Generation less than 1 MW each			0.01	0.01				
	Generation retained by facility			133.95	133.95				
	Total MWs of generation in Connecticut			6989.75	7370.95				

Appendix B

mission Lines in Connecticut

[illegible]

Appendix B

Planned Transmission Lines in Connecticut

Other Proposed Transmission Lines in Connecticut			
	Length (miles)	Voltage (kV)	Estimated In Service Date
Naugatuck Valley 115-kV Reliability Improvement Project			
Card S/S, Lebanon - Lake Road S/S, Killingly (new line)	TBD	115	2012
Lake Road S/S, Killingly - West Farnum S/S, Rhode Island (new line)	TBD	345	TBD
Millstone S/S, Waterford - Manchester S/S, Manchester (upgrade a portion of the #310 circuit)	TBD	345	TBD
Card S/S, Lebanon - Manchester S/S, Manchester (upgrade a portion of the #368 circuit)	TBD	345	TBD
Lake Road S/S, Killingly - Killingly S/S, Killingly (new circuit #1)	1.0	115	TBD
Lake Road S/S, Killingly - Killingly S/S, Killingly (new circuit #2)	1.0	115	TBD
Card S/S, Lebanon - Wawecus Junction, Bozrah (rebuild line)	12.7	115	TBD
Tunnel S/S, Lisbon - Ledyard Junction, Ledyard (rebuild to 115-kV)	8.5	69	TBD
Ledyard Junction, Ledyard - Gales Ferry S/S, Montville (rebuild to 115-kV)	1.6	69	TBD
Gales Ferry S/S, Ledyard - Montville S/S, Montville (rebuild to 115-kV)	2.4	69	TBD
Ledyard Junction, Ledyard - Buddington S/S, Groton (rebuild to 115-kV)	4.7	69	TBD
Oxbow Junction, Haddam - Beseck Junction, Wallingford (upgrade line)	14.7	115	TBD
Colony S/S, Wallingford - North Wallingford S/S, Wallingford (upgrade line)	2.4	115	TBD
Frost Bridge S/S, Watertown - Bunker Hill S/S, Waterbury (rebuild line)	3.9	115	TBD
Frost Bridge S/S, Watertown - Walnut Junction, Thomaston (new line)	6.4	115	TBD
Frost Bridge S/S, Watertown - Campville S/S, Harwinton (rebuild line)	10.3	115	TBD
North Bloomfield S/S, Bloomfield - Agawam S/S, Massachusetts (new line)	TBD	345	TBD
North Bloomfield S/S, Bloomfield - Frost Bridge S/S, Watertown (new line)	TBD	345	TBD
East Hartford S/S, East Hartford - South Meadow S/S, Hartford (reconductor a portion of the #1786 circuit)	TBD	115	TBD
Manchester S/S, Manchester - East Hartford S/S, East Hartford (new cable) (underground)	TBD	115	TBD
Northwest Hartford S/S, Hartford - Southwest Hartford S/S, Hartford (new cable) (underground)	TBD	115	TBD
Southwest Hartford S/S, Hartford - South Meadow S/S, Hartford (new cable) (underground)	TBD	115	TBD
North Bloomfield S/S, Bloomfield - South Agawam S/S, Massachusetts (modify line)	TBD	115	TBD
North Bloomfield S/S, Bloomfield - South Agawam S/S, Massachusetts (modify #1821 circuit)	TBD	115	TBD
North Bloomfield S/S, Bloomfield - South Agawam S/S, Massachusetts (modify #1836 circuit)	TBD	115	TBD
Manchester S/S, Manchester - Scovill Rock S/S, Middletown (rebuild a portion of the #353 circuit)	TBD	345	TBD
East Meriden S/S, Meriden - North Wallingford S/S, Wallingford (reconductor remaining portion of the #1466 circuit)	TBD	115	TBD
Schwab Junction, Wallingford - Colony S/S, Wallingford (upgrade line)	TBD	115	TBD
Manchester S/S, Manchester - Barbour Hill S/S, South Windsor (upgrade line)	TBD	115	TBD
Norwalk Harbor Station, Norwalk - Glenbrook S/S, Stamford (new cable) (underground)	TBD	115	TBD

Appendix A **Existing Generation** **(listed by fuel type)**

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
AES Thames	AES Thames, Inc.	Montville	Coal/Oil	181.00	182.15	12/1/1989
Bridgeport Harbor #3	PSEG Power, LLC	Bridgeport	Coal/Oil	372.21	370.37	8/1/1968
Bridgeport Energy	Bridgeport Energy LLC	Bridgeport	Gas	447.87	527.12	8/1/1998
PPL Wallingford Unit #1	PPL EnergyPlus, LLC	Wallingford	Gas	43.50	48.95	8/1/2001
PPL Wallingford Unit #2	PPL EnergyPlus, LLC	Wallingford	Gas	41.37	52.37	8/1/2001
PPL Wallingford Unit #3	PPL EnergyPlus, LLC	Wallingford	Gas	43.53	48.43	8/1/2001
PPL Wallingford Unit #4	PPL EnergyPlus, LLC	Wallingford	Gas	43.35	48.64	8/1/2001
PPL Wallingford Unit #5	PPL EnergyPlus, LLC	Wallingford	Gas	42.57	53.57	8/1/2001
Aetna Capitol District	Capitol District Energy Ctr.	Hartford	Gas/Oil	55.25	61.33	11/1/1988
Dexter	Alstom	Windsor Locks	Gas/Oil	38.00	39.00	5/1/1990
Devon #11	NRG	Milford	Gas/Oil	29.58	39.10	10/1/1996
Devon #12	NRG	Milford	Gas/Oil	29.24	38.45	10/1/1996
Devon #13	NRG	Milford	Gas/Oil	30.76	39.76	10/1/1996
Devon #14	NRG	Milford	Gas/Oil	29.75	40.33	10/1/1996
Lake Road #1	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.75	268.37	7/1/2001
Lake Road #2	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.80	268.43	11/1/2001
Lake Road #3	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	248.72	284.35	5/1/2002
Milford Power #1	Milford Power Company, LLC	Milford	Gas/Oil	239.00	267.24	2/12/2004
Milford Power #2	Milford Power Company, LLC	Milford	Gas/Oil	253.09	287.63	6/1/2004
Bantam #1	FirstLight Hydro Generating Co.	Litchfield	Hydro	0.32	0.32	1/1/1905
Bulls Bridge #1- #6	FirstLight Hydro Generating Co.	New Milford	Hydro	8.40	8.40	1/1/1903
Colebrook	MDC	Colebrook	Hydro	1.55	1.55	3/1/1988
Dayville Pond	Summit Hydro Power	Killingly	Hydro	0.06	0.10	3/1/1995
Derby Dam	McCallum Enterprises	Shelton	Hydro	7.05	7.05	3/1/1989
Falls Village #1- #3	FirstLight Hydro Generating Co.	Canaan	Hydro	7.68	7.57	1/1/1914
Glen Falls	Summit Hydro Power	Plainfield	Hydro	0.00	0.00	3/1/1998
Goodwin Dam	MDC	Hartland	Hydro	3.00	3.00	2/1/1986
Kinneytown A	Kinneytown Hydro Co.	Ansonia	Hydro	0.00	0.00	3/1/1988
Kinneytown B	Kinneytown Hydro Co.	Seymour	Hydro	1.29	1.51	11/1/1986
Mechanicsville	Saywatt Hydro Associates	Thompson	Hydro	0.14	0.27	9/1/1995
Norwich 2nd St./Greenville Dam	CMEEC	Norwich	Hydro	0.80	0.80	10/1/1998

Appendix A

Existing Generation

(listed by fuel type)

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Norwich 10th St.	CMEEC	Norwich	Hydro	0.98	1.21	1/1/1966
Putnam	Putnam Hydropower, Inc.	Putnam	Hydro	0.52	0.58	10/1/1987
Quinebaug	Quinebaug Associates LLC	Killingly	Hydro	1.03	1.30	9/1/1990
Rainbow Dam	Farmington River Power Co.	Windsor	Hydro	8.20	8.20	1/1/1980
Robertsville #1 - #2	FirstLight Hydro Generating Co.	Colebrook	Hydro	0.60	0.62	1/1/1924
Rocky Glen/Sandy Hook Hydro	Rocky Glen Hydro LP	Newtown	Hydro	0.11	0.11	4/1/1989
Rocky River	FirstLight Hydro Generating Co.	New Milford	Hydro-pump stg.	29.35	29.00	1/1/1928
Scotland #1	FirstLight Hydro Generating Co.	Windham	Hydro	2.20	2.20	1/1/1937
Shepaug #1	FirstLight Hydro Generating Co.	Southbury	Hydro	41.51	42.56	1/1/1955
Stevenson #1 - #4	FirstLight Hydro Generating Co.	Monroe	Hydro	28.31	28.90	1/1/1919
Taftville #1 - #5	FirstLight Hydro Generating Co.	Norwich	Hydro	2.03	2.03	1/1/1906
Toutant	Toutant Hydro Power, Inc.	Putnam	Hydro	0.40	0.40	2/1/1994
Tunnel #1 - #2	FirstLight Hydro Generating Co.	Preston	Hydro	2.10	2.10	1/1/1919
Willimantic #1	Willimantic Power Corp.	Willimantic	Hydro	0.77	0.77	6/1/1990
Willimantic #2	Willimantic Power Corp.	Willimantic	Hydro	0.77	0.77	6/1/1990
Wyre Wynd	Summit Hydro Power	Griswold	Hydro	2.49	2.78	4/1/1997
Hartford Landfill	CRRA	Hartford	Methane	1.90	1.90	8/1/1998
New Milford Landfill	Vermont Electric Power Co.	New Milford	Methane/Oil	1.61	1.61	8/1/1991
Millstone #2	Dominion Nuclear CT, Inc.	Waterford	Nuclear	879.84	881.96	12/1/1975
Millstone #3	Dominion Nuclear CT, Inc.	Waterford	Nuclear	1155.00	1155.48	4/1/1986
Branford #10	NRG	Branford	Oil	15.84	20.95	1/1/1969
Bridgeport Harbor #2	PSEG Power, LLC	Bridgeport	Oil	130.50	147.51	8/1/1961
Bridgeport Harbor #4	PSEG Power, LLC	Bridgeport	Oil	9.92	14.72	10/1/1967
Cos Cob #10	NRG	Greenwich	Oil	17.18	22.08	9/1/1969
Cos Cob #11	NRG	Greenwich	Oil	18.24	23.23	1/1/1969
Cos Cob #12	NRG	Greenwich	Oil	18.44	23.34	1/1/1969
Devon #10 (reactivated)	NRG	Milford	Oil	15.27	19.21	4/1/1988
Franklin Drive #10	NRG	Torrington	Oil	15.42	20.53	1/1/1968
Middletown #4	NRG	Middletown	Oil	400.00	402.00	6/1/1973
Middletown #10	NRG	Middletown	Oil	17.12	22.02	1/1/1966
Montville #6	NRG	Montville	Oil	407.40	409.91	7/1/1971

Appendix A

Existing Generation

(listed by fuel type)

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Montville #10 & #11	NRG	Montville	Oil	5.30	5.35	1/1/1967
Norwalk Harbor #1	NRG	Norwalk	Oil	162.00	164.00	1/1/1960
Norwalk Harbor #2	NRG	Norwalk	Oil	168.00	172.00	1/1/1963
Norwalk Harbor #10 (3)	NRG	Norwalk	Oil	11.93	17.13	10/1/1996
Norwich Jet	CMEEC	Norwich	Oil	15.26	18.80	9/1/1972
South Meadow #11	CRRA	Hartford	Oil	35.78	46.92	8/1/1970
South Meadow #12	CRRA	Hartford	Oil	37.70	47.87	8/1/1970
South Meadow #13	CRRA	Hartford	Oil	38.32	47.92	8/1/1970
South Meadow #14	CRRA	Hartford	Oil	36.75	46.35	8/1/1970
Torrington Terminal #10	NRG	Torrington	Oil	15.64	20.75	8/1/1967
Tunnel #10	FirstLight Hydro Generating Co.	Preston	Oil	15.89	20.76	1/1/1969
Waterside Power	Waterside Power	Stamford	Oil	72.00	72.00	10/1/2006
Devon #7	NRG	Milford	Oil/Gas	0.00	0.00	1/1/1956
Middletown #2	NRG	Middletown	Oil/Gas	117.00	120.00	1/1/1958
Middletown #3	NRG	Middletown	Oil/Gas	236.00	245.00	1/1/1964
Montville #5	NRG	Montville	Oil/Gas	81.00	81.59	1/1/1954
New Haven Harbor #1	PSEG Power, LLC	New Haven	Oil/Gas	447.89	454.64	8/1/1975
Bridgeport Resco	CRRA	Bridgeport	Refuse	58.52	58.74	4/1/1988
Bristol RRF	Ogden Martin Systems-CT	Bristol	Refuse/Oil	13.20	12.74	5/1/1988
Lisbon RRF	Riley Energy Systems	Lisbon	Refuse	12.96	13.04	1/1/1996
South Meadow #5	CRRA	Hartford	Refuse	25.60	29.21	1/1/1987
South Meadow #6	CRRA	Hartford	Refuse	27.11	28.12	1/1/1987
Preston RRF	SCRFF	Preston	Refuse/Oil	16.01	16.51	1/1/1992
Wallingford RRF	CRRA	Wallingford	Refuse/Oil	6.35	6.90	3/1/1989
Exeter	Oxford Energy, Inc.	Sterling	Tires/Oil	24.17	25.66	12/1/1991
Pinchbeck	William Pinchbeck, Inc.	Guilford	Wood	0.01	0.01	7/1/1987
	Seasonal Claimed Capability of coal fired plants			553.21	552.52	
	Seasonal Claimed Capability of natural gas fired plants			1366.86	1591.92	
	Seasonal Claimed Capability of oil fired plants			2561.79	2706.59	
	Seasonal Claimed Capability of hydroelectric plants			151.66	154.10	

Appendix A **Existing Generation** **(listed by fuel type)**

	Seasonal Claimed Capability of methane fired plants	3.51	3.51	
	Seasonal Claimed Capability of nuclear plants	2034.84	2037.44	
	Seasonal Claimed Capability of refuse fueled plants (inc. tires)	183.92	190.92	
	Seasonal Claimed Capability of wood fired plants	0.01	0.01	
	Total Seasonal Claimed Capability available for dispatch to the grid. (Lake Road is excluded from the total.)	6855.80	7237.00	
Facility (self generation)	Owner	Town	Fuel	Summer Rating Winter Rating In-Service Date
Locite	Locite	Rocky Hill	Gas	1.18 1.18 4/1/1994
Norwalk Hospital	Norwalk Hospital	Norwalk	Gas	2.36 2.36 1/1/1992
Pratt & Whitney	UTC	E. Hartford	Gas	23.80 23.80 4/1/1992
Connecticut Valley Hospital	State of Connecticut	Middletown	Oil	2.05 2.05 5/9/1999
Fairfield Hills Hospital	Fairfield Hills Hospital	Newtown	Oil	3.95 3.95 5/9/1999
Federal Paper Board	Federal Paper Board	Sprague	Oil	9.00 9.00 5/9/1999
Fishers Island Elec. Co.	Fishers Island Elec. Co.	Groton	Oil	1.10 1.10 1/1/1965
Norwich State Hospital	Norwich State Hospital	Norwich	Oil	2.00 2.00 5/9/1999
Pfizer #1	Pfizer	Groton	Oil	32.50 32.50 1/1/1948
Pratt & Whitney	UTC	Middletown	Oil	1.00 1.00 5/9/1999
Southbury Training School	State of Connecticut	Southbury	Oil	1.50 1.50 5/9/1999
Groton Sub Base	U.S. Navy	Groton	Oil/Gas	18.50 18.50 1/1/1966
Smurfit-Stone Container Co.	Smurfit-Stone Container Co.	Montville	Refuse	2.00 2.00 9/1/1989
University of Conn. COGEN	State of Connecticut	Mansfield	Gas/Oil	24.90 24.90 8/1/2005
	Total Natural Gas Fired Generation less than 1 MW each	4.42	4.42	
	Total Propane Fired Generation less than 1 MW each	0.03	0.03	
	Total Hydroelectric Generation less than 1 MW each	3.33	3.33	
	Total Methane Fueled Generation less than 1 MW each	0.13	0.13	

Appendix A
Existing Generation
(listed by fuel type)

Total Solar (photovoltaic) Generation less than 1 MW each	0.15	0.15	
Total Wind Powered Generation less than 1 MW each	0.04	0.04	
Total Oil Powered Generation less than 1 MW each	0.01	0.01	
Generation retained by facility	133.95	133.95	
Total MWs of generation in Connecticut	6989.75	7370.95	

Appendix B

Commission Lines in Connecticut

[illegible]

Appendix B

Planned Transmission Lines in Connecticut

Other Proposed Transmission Lines in Connecticut		Length (miles)	Voltage (kV)	Estimated In Service Date
Naugatuck Valley 115-kV Reliability Improvement Project				
Card S/S, Lebanon - Lake Road S/S, Killingly (new line)	TBD	115	2012	
Lake Road S/S, Killingly - West Farnum S/S, Rhode Island (new line)	TBD	345	TBD	
Millstone S/S, Waterford - Manchester S/S, Manchester (upgrade a portion of the #310 circuit)	TBD	345	TBD	
Card S/S, Lebanon - Manchester S/S, Manchester (upgrade a portion of the #368 circuit)	TBD	345	TBD	
Lake Road S/S, Killingly - Killingly S/S, Killingly (new circuit #1)	1.0	115	TBD	
Lake Road S/S, Killingly - Killingly S/S, Killingly (new circuit #2)	1.0	115	TBD	
Card S/S, Lebanon - Wawecus Junction, Bozrah (rebuild line)	12.7	115	TBD	
Tunnel S/S, Lisbon - Ledyard Junction, Ledyard (rebuild to 115-kV)	8.5	69	TBD	
Ledyard Junction, Ledyard - Gales Ferry S/S, Ledyard (rebuild to 115-kV)	1.6	69	TBD	
Gales Ferry S/S, Ledyard - Montville S/S, Montville (rebuild to 115-kV)	2.4	69	TBD	
Ledyard Junction, Ledyard - Buddington S/S, Groton (rebuild to 115-kV)	4.7	69	TBD	
Oxbow Junction, Haddam - Beseck Junction, Wallingford (upgrade line)	14.7	115	TBD	
Colony S/S, Wallingford - North Wallingford S/S, Wallingford (upgrade line)	2.4	115	TBD	
Frost Bridge S/S, Watertown - Bunker Hill S/S, Waterbury (rebuild line)	3.9	115	TBD	
Frost Bridge S/S, Watertown - Walnut Junction, Thomaston (new line)	6.4	115	TBD	
Frost Bridge S/S, Watertown - Campville S/S, Harwinton (rebuild line)	10.3	115	TBD	
North Bloomfield S/S, Bloomfield - Agawam S/S, Massachusetts (new line)	TBD	345	TBD	
North Bloomfield S/S, Bloomfield - Frost Bridge S/S, Watertown (new line)	TBD	345	TBD	
East Hartford S/S, East Hartford - South Meadow S/S, Hartford (reconductor a portion of the #1786 circuit)	TBD	115	TBD	
Manchester S/S, Manchester - East Hartford S/S, East Hartford (new cable) (underground)	TBD	115	TBD	
Northwest Hartford S/S, Hartford - Southwest Hartford S/S, Hartford (new cable) (underground)	TBD	115	TBD	
Southwest Hartford S/S, Hartford - South Meadow S/S, Hartford (new cable) (underground)	TBD	115	TBD	
North Bloomfield S/S, Bloomfield - Southwick S/S, Massachusetts (modify line)	TBD	115	TBD	
North Bloomfield S/S, Bloomfield - South Agawam S/S, Massachusetts (modify #1821 circuit)	TBD	115	TBD	
Manchester S/S, Manchester - Scovill Rock S/S, Middletown (rebuild a portion of the #1836 circuit)	TBD	115	TBD	
East Meriden S/S, Meriden - North Wallingford S/S, Wallingford (reconductor remaining portion of the #1466 circuit)	TBD	115	TBD	
Schwab Junction, Wallingford - Colony S/S, Wallingford (upgrade line)	TBD	115	TBD	
Manchester S/S, Manchester - Barbour Hill S/S, South Windsor (upgrade line)	TBD	115	TBD	
Norwalk Harbor Station, Norwalk - Glenbrook S/S, Stamford (new cable) (underground)	TBD	115	TBD	